

Necedah National Wildlife Refuge

Necedah, Wisconsin

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Necedah National Wildlife Refuge
Annual Narrative Report
1966

1.

I. GENERAL

A. Weather Conditions

	<u>Month</u>	<u>Precipitation</u>		<u>Max.</u> <u>Temp.</u>	<u>Min.</u> <u>Temp.</u>
		<u>Normal</u>	<u>Snowfall</u>		
January	<u>1.12</u>	<u>1.02</u>	<u>10.50</u>	<u>40</u>	<u>- 30</u>
February	<u>1.57</u>	<u>1.01</u>	<u> </u>	<u>47</u>	<u>- 30</u>
March	<u>4.44</u>	<u>1.91</u>	<u>.50</u>	<u>72</u>	<u>- 1</u>
April	<u>1.72</u>	<u>2.65</u>	<u>.25</u>	<u>70</u>	<u>21</u>
May	<u>1.78</u>	<u>4.38</u>	<u> </u>	<u>86</u>	<u>16</u>
June	<u>1.65</u>	<u>4.98</u>	<u> </u>	<u>97</u>	<u>31</u>
July	<u>6.02</u>	<u>3.77</u>	<u> </u>	<u>98</u>	<u>41</u>
August	<u>2.04</u>	<u>3.33</u>	<u> </u>	<u>92</u>	<u>41</u>
September	<u>1.49</u>	<u>3.35</u>	<u> </u>	<u>89</u>	<u>19</u>
October	<u>1.02</u>	<u>2.27</u>	<u> </u>	<u>82</u>	<u>14</u>
November	<u>.78</u>	<u>2.24</u>	<u>.25</u>	<u>59</u>	<u>5</u>
December	<u>1.81</u>	<u>1.36</u>	<u>16.75</u>	<u>47</u>	<u>17</u>
Annual Totals	<u>25.44</u>	<u>32.26</u>	<u>28.25</u>	<u>Extremes 98</u>	<u>- 30</u>

January was a very cold month. The U. S. Weather Bureau reported it as one of the colder months of the century. Temperatures ranged from 6 to 12 degrees below normal. On 19 days the temperature dropped below zero degrees. Precipitation in the form of snow was about normal.

February was unusual and heavy rainfall over much of the State on the 8th and 9th highlighted the month's weather. One and one-half inches of rain on the snow covered frozen ground caused a sloppy mess. Temperatures for the month averaged slightly above normal. No snow was recorded for the entire month which is rather unusual.

March was much warmer than usual with temperatures about 8° above normal. Frequent showers accounted for nearly twice the normal precipitation. A strong southwest wind on the afternoon of March 31 reaching nearly 40 MPH caused some damage to refuge timber. Pools were ice free by March 22. Only $\frac{1}{2}$ inch of snow fell during the month and it melted the next day.

April was cloudy and slightly colder than normal. On April 5th, $\frac{1}{4}$ inch of snow was recorded, the last of the season. Although showers were frequent, precipitation was about one inch below normal.

May was dry and cold, in fact, the coldest May on record. On May 10th the temperature dropped to 16° and frosts occurred on the last three days of the month damaging blueberry and other berry plants that were in bloom.

June varied from cool to hot but the transition from late spring to mid-summer temperatures was very abrupt. Early in the month below normal temperatures were recorded. On the 20th warm weather set in with highs near 90° being reported on the last 10 days. A 3 inch deficiency in precipitation added significance as it came on the heels of a rather dry April and May.

July was a hot month. The unseasonably warm weather that began in June continued through the first 2 weeks of July. Frequent thunderstorms during the month resulted in about $2\frac{1}{4}$ " over normal precipitation. On July 10th, strong winds, some hail and funnel clouds passed over the refuge in early evening hours. Slight damage to refuge timber occurred near the Remington structure and east end of the Finley road.

August temperatures continued to range above normal with the mercury reaching 90° or more the last three days of the month. Although showers were frequent, they were light and accounted for only 2 inches of precipitation. Some refuge crops were lost because of the hot, dry spell.

September weather was cool and very dry. Precipitation received during the month was less than half the normal amount. The first killing frost occurred on September 15, which is well past the average date for this area. Thunderstorm and shower activity was very limited, and no unusually severe weather was experienced.

October weather continued on the mild order with less than half the normal precipitation recorded. On October 6th the mercury dipped to 23 degrees but then remained rather mild until the 24th when it dropped to 16 degrees. The first snow flurries occurred on October 31 but melted upon touching the ground.

November continued to be dry. Snowfall was recorded on the 11th and 20th but melted soon afterwards. Temperatures averaged about 10 degrees below normal. All pools were frozen over by the end of the month.

December showed the many faces of winter. We saw snow, rain, bitter cold and sunshine. Snow fell on 5 days, the heaviest accumulation of 12 inches falling on the 27th and 28th. Total snowfall for the month was 16 inches. On 9 days the temperature dropped below zero. Temperatures on the average were above normal.

B. Habitat Conditions

1. Water

Precipitation received at Necedah this year amounted to about half of the record high of 47.83 inches received in 1965. This year 25.44 inches were recorded, well below the average annual precipitation of 32.27 inches for the past 27 years of record keeping. The below average precipitation during the year resulted in a gradual deterioration of water levels on most impoundments.

Snow conditions during the winter months were well below normal even though precipitation for the first three months amounted to 7.13 inches, highest since record keeping began. Generally the spring thaw was gradual and runoff was easily passed through all refuge water control structures without damage to structures or dikes. Most pools were ice free by the 3rd week of March and all were held near approved elevations during the spring period. The new APW Pool 9 structure had to be drained early in April because of a washout between two sections of culvert and the weakening of the channel which holds the stoplogs in the structure. Water was not impounded in this pool during the remainder of the year.

Below normal precipitation occurred throughout the summer months with the exception of July. Little water was released from cranberry marshes north of the refuge as in past years. Pool elevations held near normal until July but began to drop because of lack of rain. Receding water levels was most apparent on the smaller impoundments and on the Sprague Pool. Levels on Rynearson Pool 1 remained fairly constant until the first week in October. Pool 13 was drained beginning the first of May since it is being managed as a green tree reservoir. The Goose Pool and Rynearson Pool 2 were both drained in June for the production of moist soil food plants.

The period of September through December was no exception to below normal precipitation as 5.10 inches were received during the four month period. Water levels continued to drop and by November

the Sprague Pool was 2 feet below approved elevation. Reflooding of the Goose Pool and Ryneerson Pool 2 was slow and much of the millet and smartweed was not available to ducks because of the lack of water to flood it. Attempts to reflood Pool 13 were futile.

Generally, flooded habitat was ample for the normal waterfowl populations which utilize the refuge. Water conditions during the spring and early summer period were favorable for the spring migration and the establishment of breeding waterfowl. There was no apparent lack of brood water although shortages may have occurred on the smaller northern impoundments. Low fall water levels on the Sprague Pool limited diver use on that unit, however exposed flats were very attractive to geese.

For the most part the refuge pools were frozen over by the end of November with water levels well below normal. Snow conditions in December were good and with normal precipitation during the remainder of the winter no difficulty is expected in recharging refuge pools.

2. Food and Cover

Generally food and cover conditions on the refuge were favorable throughout the year. The excellent growing season of 1965 insured an abundant food supply and sufficient cover for all resident wildlife during the winter months. Upland game birds and song birds had an excellent supply of mast, buds, and weed seeds to carry them through the winter. During the brief period when snow limited normal feeding activity, turkeys were often seen along refuge trails scratching for acorns.

By the 3rd week of March most of the pools were ice free and providing food for the first migrant ducks. Seeds of moist soil plants in Ryneerson Pool 2 were well utilized by geese and whistling swans in April. Agricultural units also provided some browse and left over buckwheat for migrating geese, deer, and upland game.

Excellent growth of vegetation in 1965 insured ample nesting cover for most wildlife species. Controlled burning the previous spring encouraged the development of good nesting cover in areas of high waterfowl nesting density. Frosts in late May killed many of the wild berry crops although more blueberries survived this year than last year. Chokecherry and elderberry were not affected by the frost and produced a bumper crop. Insect and aquatic animal life appeared to be plentiful and provided the bulk of the food for the young of upland game and waterfowl.

Aquatic plants on Sprague and Ryneerson 1 Pools provided an abundant food supply for local and fall migrant waterfowl in spite of low water levels on the Sprague Pool which dried up many areas

that normally produce aquatics. The vast exposed mud flats in the Sprague Pool grew spikerush and needlerush which attracted large numbers of geese. The smaller impoundments provided limited quantities of submerged aquatics. The most common aquatics found in all refuge pools included many species of pondweeds, water milfoil, elodea, coontail and bladderwort. Rynearson Pool 1 was the only pool to have significant beds of wild celery. Moist soil food plants, smartweed, wild millet, bidens and cyperus produced excellent seed crops this year. The Goose and Rynearson 2 pools were managed for moist soil plant production with some Japanese millet being sown in the Goose Pool. Weather conditions were favorable and perhaps one of the best crops of wild millet, smartweed and Japanese millet was grown this year. These species were supplemented by bidens which sprouted seed everywhere. Much of the seed produced was not made available because of the water shortage this fall but will provide more than an ample supply for the spring migration. On the portions of the pools flooded waterfowl use was good.

In spite of the dry summer the refuge agricultural crops did extremely well. A total of 80 acres of buckwheat, 40 acres of corn and 112 acres of browse crops provided large quantities of food. Heaviest use as in other years was from geese and sandhill cranes.

Most of the grain crops which were concentrated on the Canfield Units were well utilized with very little corn and only limited buckwheat seed remaining. Turkeys favor the farm fields during the winter when snow cover is absent. In past years, sharp-tailed grouse have also been known to use the fields.

Fall and winter cover was good even though much of the growing season was characterized by dry weather. Seed production for some plant species was excellent while for others it was very poor. Weed seeds are in good supply but mast production so important to the turkey, deer and squirrel was limited. Acorn production was poor to fair depending upon the location. Production is estimated to be about one-third of last years crop. If December is any indication of what is to come, resident wildlife populations will experience a difficult winter. During the month 17 inches of snow were recorded and much of the available food and cover was under a blanket of snow.

II. WILDLIFE

1. Waterfowl

a. Whistling Swans

The first whistling swans arrived on the refuge March 15

with 5 utilizing Ryneearson Pool 2. For the next two weeks swan use was limited to Ryneearson 1. During the period April 3-9th, a general migration was noted over the refuge and 270 of these majestic birds stopped on Pool 2. The peak of 270 was the second highest at this station, comparing to a peak of 400 in the spring of 1961. The birds continued their northward migration during the weekend of the 9th when numerous flocks were observed moving north. A lone swan was seen on April 21 on the Sprague Pool.

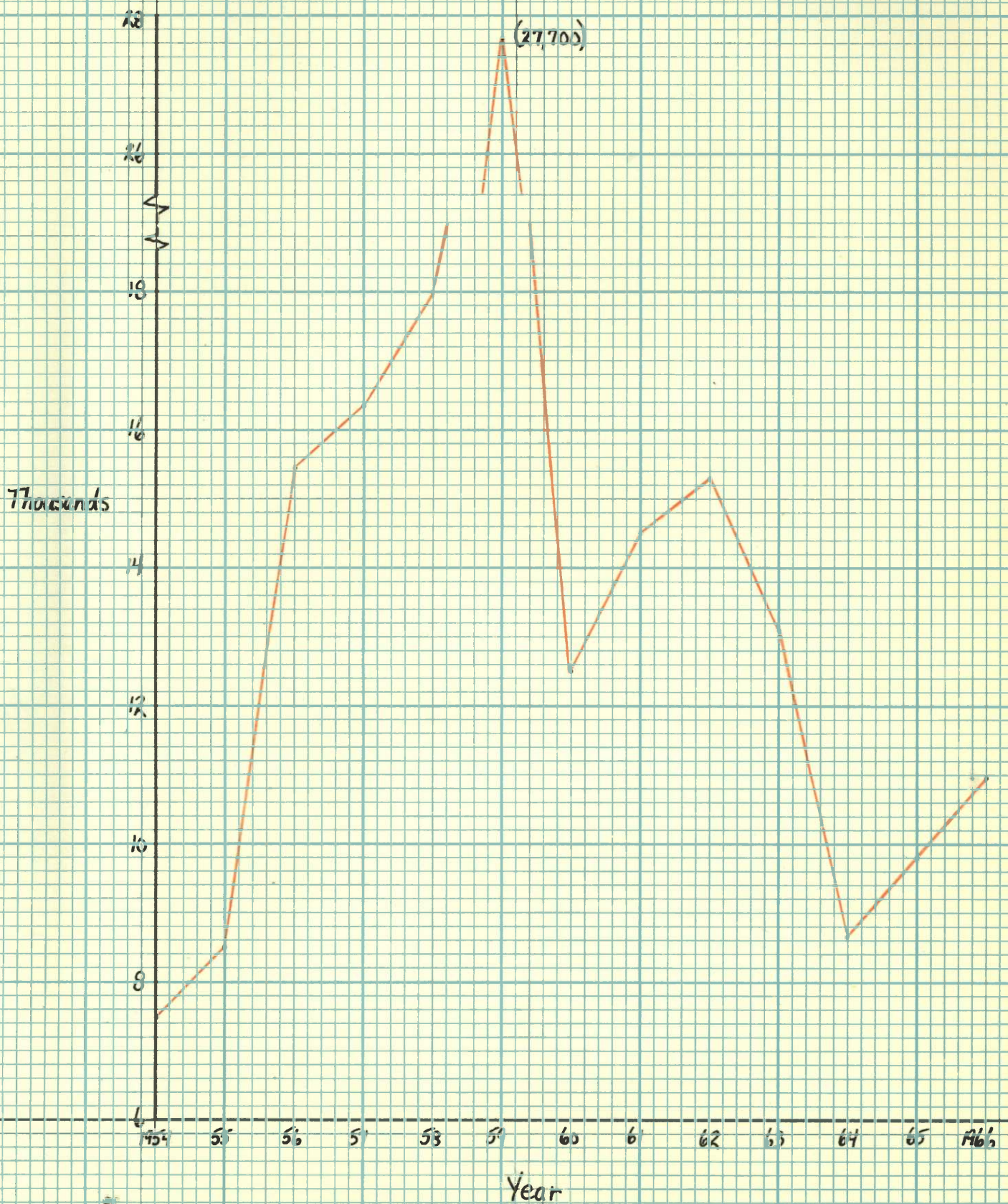
In late October, 8 swans were observed and for the next four weeks between 16 and 26 utilized Ryneearson 1. Two family groups containing three and four young were seen in this fall population. During November several flocks were observed flying east across the refuge. Cold weather forced the last of the swans south during the last week of November. Swan use increased 273% over last year with most of the increase from the spring peak of 270 which resulted in 2,114 use-days.

b. Geese

The first spring migrants were observed on the Sprague Pool on March 3. This early flock numbered 25 birds. Unusually mild March temperatures opened most of the pools and large numbers moved in during the week of March 20-26. The spring peak of 3,500 was a month earlier than last years peak of 1,500. Unseasonably mild temperatures ended on the evening of the 22nd when blizzard conditions and 3 inches of snow covered the pools. Many geese moved south to open water but 1,450 remained even though conditions were cold and windy. Through the remainder of the period there was a gradual migration through the refuge. Most of the early use was on the Sprague Pool but during April there was a general shift to Ryneearson Pool 2. Total spring use-days numbered 72,100, a large increase over the 25,591 reported last year and 20% above the 5-year average. By the end of April only 610 Canadas remained on the refuge. Considerable off refuge feeding occurred but at times good use was made of refuge agricultural units, particularly the buckwheat strips in the Canfield Units.

The refuge Canada goose breeding population was 90 and represented 35 breeding pairs. Goose production showed little change from last year as 40 were raised to flight stage compared to 42 in 1965. Production for the past 5 years has averaged 40. The first clutch hatched on May 3, about two weeks earlier than normal. Seven nests with an average clutch size of 6.1 were located on the islands of Ryneearson 1 and 2, and Pool 19. Six of the nests hatched and two additional broods were seen on refuge pools. Based on these observations the total number of broods was estimated at 12 with an average brood size to flight stage of 3.3. The 75 fiberglass goose nesting structures that were placed on refuge pools this spring had no use during the first breeding season.

Peak Canada Goose Populations



Three nests were lifted onto nest structures placed on the ground with two of the clutches hatching successfully. Hopefully the young will be imprinted to the structures and return to nest on them.

Local geese began staging during the second week of August when 250 birds were present on the refuge pools. Migrant Canada geese began moving into the refuge during the second week of September and gradually increased to the fall peak of 10,950 during the week of October 9-15. The peak shows a slight increase from the peak of 9,800 in 1965 and a 5.3% decrease from the 5-year average. Throughout the fall period most of the goose use was on the Sprague and Rynearson 2 pools with a shift in use from the Sprague Pool to Pool 2 beginning the first of October. This shift was largely attributed to the flooding of the moist soil plants in Pool 2. Geese also made excellent use of the exposed spikerush covered mud flats on the Sprague Pool. Feeding flights to refuge agricultural units were established early and complete utilization of the 40 acres of corn was obtained. Use of buckwheat and the limited browse crops was also good. Off refuge feeding flights provided some goose hunting opportunities but fair weather and a short 2 1/2 day season resulted in low harvest for the area. Even though spring use was up, total goose use-days for 1966 was down 2.7% from last year and 20% below the 5-year average.

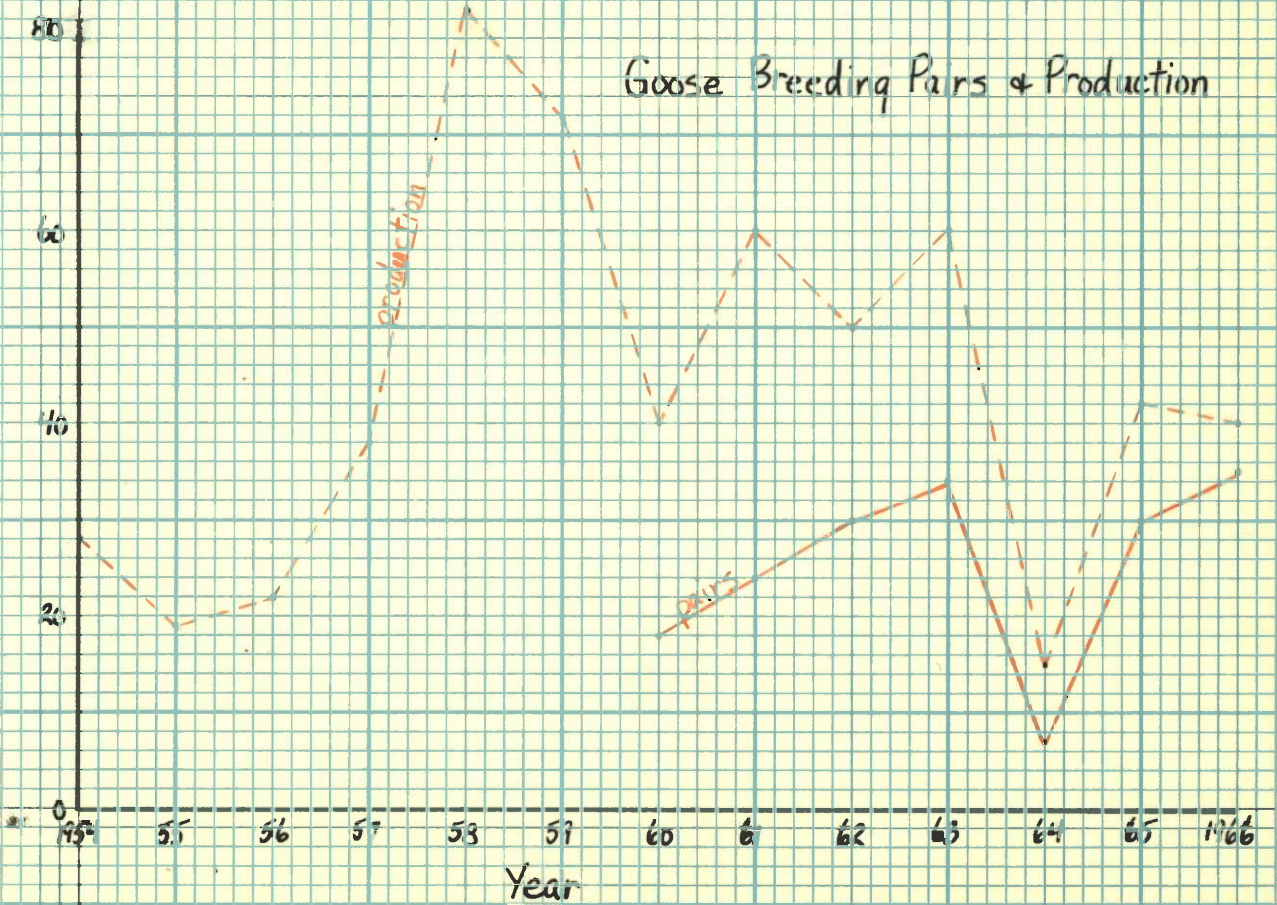
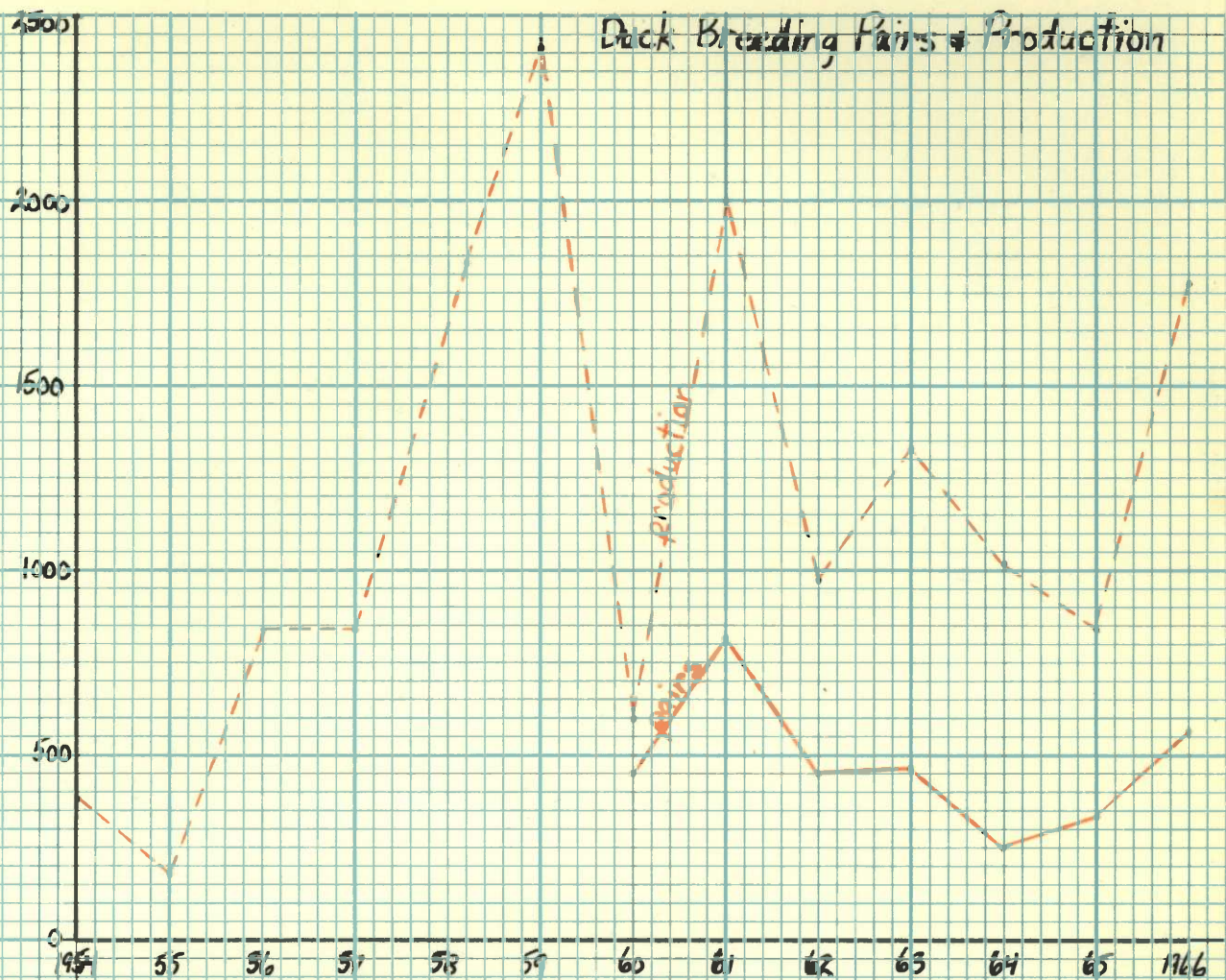
No blue and snow geese stopped on the refuge this spring although several flights were seen passing over the area. During the last week of September 5 snow geese were sighted on the Sprague Pool. The population gradually increased until it peaked at 910 during the week of October 16-22, about two weeks later than last years peak of 725. Of the total, 550 were snow geese, 360 were blues. Most of the use was on the Goose and Rynearson 2 pools where there was an abundance of moist soil food plants. Limited use was made of the Canfield agricultural units. Total use-days was down 9.2% from last year and 45% from the 5-year average.

Goose Use Days

	<u>1966</u>	<u>1965</u>	<u>1964</u>	<u>5-year average</u>
Canada	412,460	424,054	537,887	516,417
Blue, Snow and White-fronts	<u>14,945</u>	<u>16,457</u>	<u>15,309</u>	<u>27,192</u>
Total:	427,405	440,511	553,196	543,609

c. Ducks

The population experienced a 51% increase in spring duck use-days but a 12.5% decrease in the peak population. Unusually mild March temperatures caused an early migration and the birds



lingered on the refuge longer. The peak was a full 3 weeks earlier than in 1965. The peak of 3,615 was reached during the week of March 20-26, 2,250 of which were mallards. Only 800 mallards were recorded last spring in a population that peaked at 4,130. Other species experiencing substantial increases included black duck, baldpate, green-winged teal, ring-necked duck, goldeneye and common merganser. Lesser scaup and hooded merganser use was considerably lower.

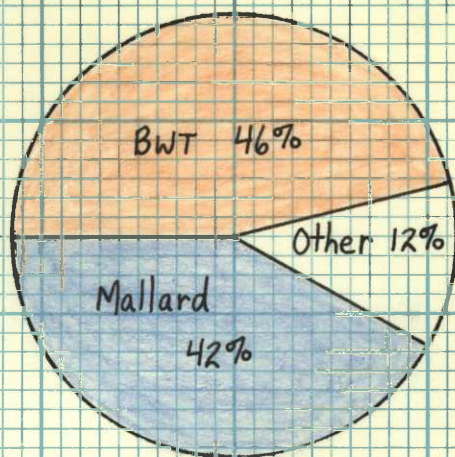
Approximately 2/3's of the total duck use occurred on the Sprague Pool, mainly because of the large concentration of mallards using the unit. During the last two weeks of the period Ryneerson Pool 1 was a favorite of lesser scaup. Generally feeding ducks were dispersed throughout the refuge pools but major feeding flights occurred to the south and east of the refuge. Puddle duck use on Pools 18, 19, and 13 was encouraging with excellent use by mallards, blue-winged and green-winged teal.

Duck use during the summer period was up 17.5% from 1965 with mallards increasing 40%. Decreases were noted for most species of divers. By the third week of May the population had stabilized to the summer breeding population of about 1,500. Duck production more than doubled this year, 1,775 were produced compared to 845 in 1965. Production figures were based on aerial breeding pair counts conducted in May and random brood observations. The correlated ground to air pair count showed a total of 564 pairs compared to 331 in 1965. This years count was 37% above the 5-year average. Mallards and blue-winged teal made up 42% and 46%, respectively, of the breeding population and probably made up 80% of the total refuge production. Green-winged teal, wood duck, black duck, ring-necked duck and hooded merganser produced the remaining 20%. Good cover conditions, favorable weather and decreased predator activity contributed to the increase in this year production.

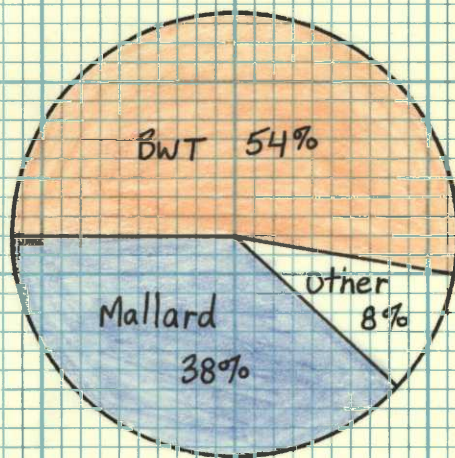
The usual influx of wood ducks probably from the Yellow River bottomlands, occurred during the second week of June when non-breeders and breeding males concentrated on the refuge for the molt.

Fall migrant ducks began filtering in during September with blue-winged teal reaching their peak during the second week. All other species gradually increased until the fall peak of 15,915 was reached during the week of October 23-29. Mallards represented 51% of the peak, and throughout the period of heaviest duck use accounted for approximately half of the duck population. The peak was down 9% from 1965 and 35% from the 5-year average. Fall use-days were down similarly, 17% from last year and 41% from the 5-year average. Mallard use remained well below the long term average even though numbers increased slightly. Baldpate use which made up 33% of the fall peak decreased and was also below the long term average. Species which showed a significant increase included black duck, pintail and green-winged teal. Lesser scaup, baldpate, wood duck and gadwall use-days were down with scaup and baldpate showing decreases of 84% and 41%, respectively.

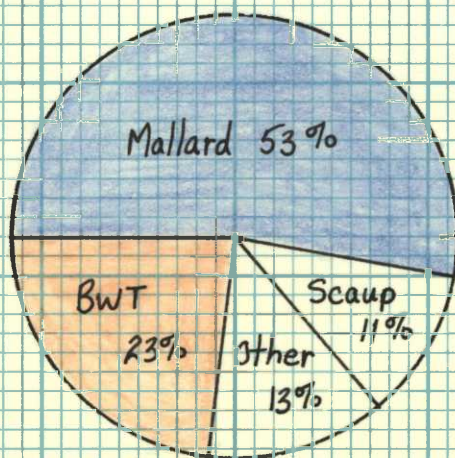
Species Composition of Pair Count Data (reflecting production)



1966
564 pairs



1965
331 pairs



1964
1037 pairs

Mallard use was equally divided between the Sprague and Ryneerson 2 pools. Excellent stands of moist soil plants on Pool 2 and the Goose Pool provided the main attraction for mallards and other puddle ducks. Baldpate and diver use on the Sprague Pool was disappointing this year due mainly to low water levels. Beds of aquatics on Ryneerson 1 were particularly attractive to baldpate. Duck numbers decreased gradually through November and on the 27th a cold front with high winds forced the last of the birds south.

Annual duck use-days were down 4.8% from 1965 and 27.8% from the 5-year average.

Peak Duck Populations

	<u>1966</u>	<u>1965</u>	<u>1964</u>	<u>5-year Average</u>
Spring	3,615	4,130	3,710	5,465
Fall	15,915	17,535	20,615	24,611

Annual Duck and Coot Use-Days

	<u>1966</u>	<u>1965</u>	<u>1964</u>	<u>5-year Average</u>
Ducks	992,695	1,042,307	1,092,562	1,375,451
Coots	207,920	72,530	293,090	210,496

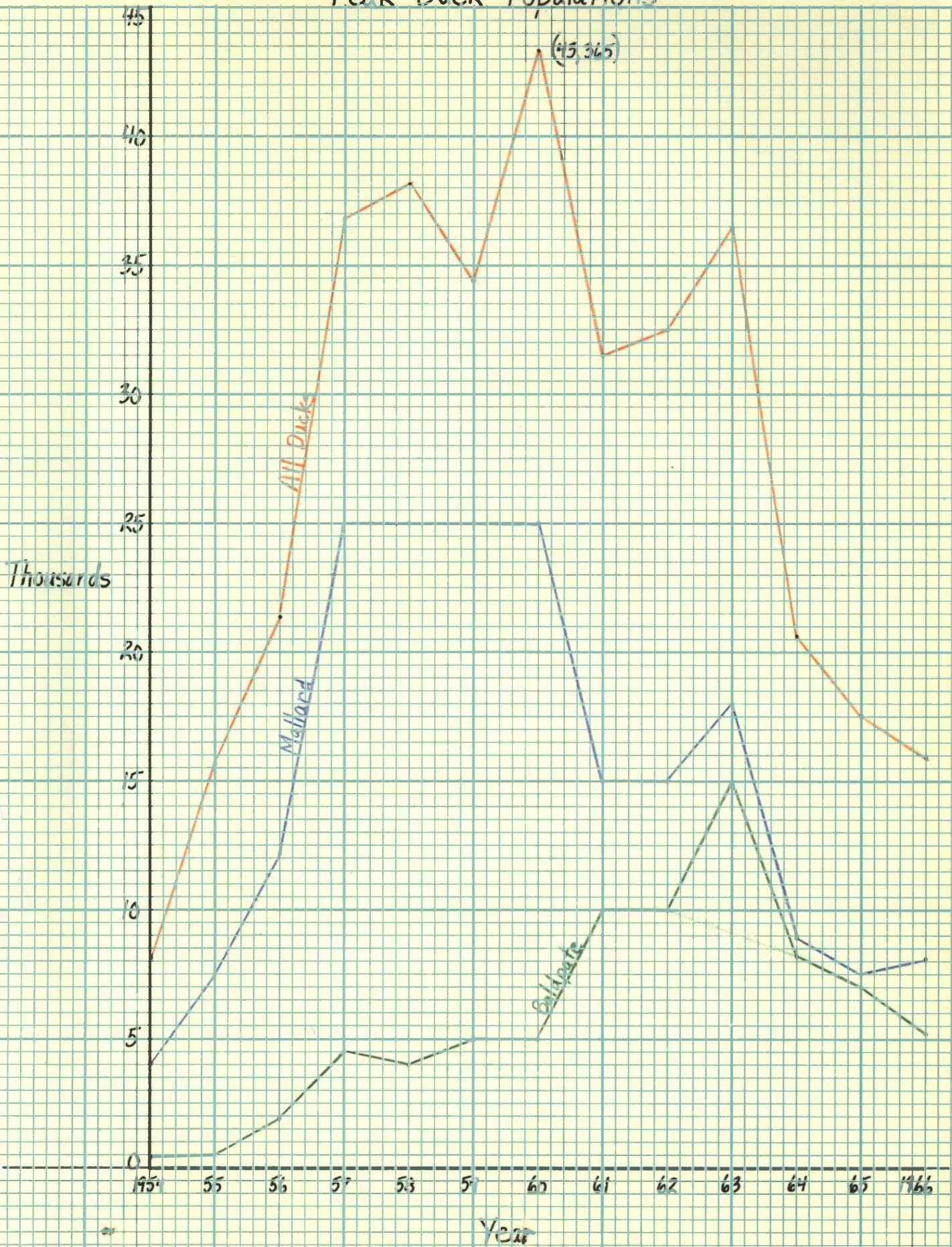
d. Coots

The first observation of coot was made on the Sprague Pool May 12th when 3 birds were seen. Spring coot use was down from last year. Total numbers reached 200 compared to last years peak of 300 and the previous years high of 1,000. Spring use-days were down more than 50%, 2,520 compared to 5,300, with Ryneerson Pool 1 accounting for just under half of the use-days.

Coot production showed little change. Production was estimated to be 35, compared to 30 in 1965. No broods were observed but nesting may have occurred on the Sprague and Ryneerson Pools, or Pools 18 and 19.

The fall peak of 7,300 showed a considerable increase over last years peak of 2,000. Almost all of the use was on the Sprague and Ryneerson 1 pools with 2/3's of it occurring on the latter pool. Use of the Sprague Pool was limited to the few areas where low water levels had not dried up beds of aquatics. Prolonged use of aquatics throughout Pool 1 resulted in a refuge total of 207,920 use-days, a 187% increase over last year. Total use was only slightly below the 5-year average of 210,496 use-days.

Peak Duck Populations



Peak Coot Populations

	<u>1966</u>	<u>1965</u>	<u>1964</u>	<u>5-year Average</u>
Spring peak	200	300	1,000	420
Fall peak	7,300	2,000	7,750	7,010

2. Other Water Birds

Sandhill crane use was up this year with the fall peak of 250 the second highest concentration ever recorded for the refuge. The first cranes were seen on March 16 when a group of 10 moved onto the refuge. The peak during the spring period was 35 compared to 40 last year. Between 45 and 60 spent the summer on the refuge with some raising young. Production of these birds has been suspected in the past but has never been confirmed. On May 19, two 1-2 day old young were positively identified near the east dike banding site of Rynearson Pool 1. On June 12, two half-grown young were seen crossing the Williams Dike with their parents and a photographic record was obtained. Possibly the two observations were of the same birds. The drained Rynearson Pool 2 area was a favored feeding area for cranes throughout the year and as many as 2/3's of the fall population could be seen there. The cranes also made excellent use of agricultural crops on the Canfield Units. The peak of 250 this fall compares to 150 the previous fall.

Great blue herons first arrived on March 21 and gradually built up to a spring peak of 50-70 in mid-April. The number of nests in the Sprague Pool rookery increased from 18 to 29 this year with many new nests built near the water level. In 1959 approximately 300 heron and 25 cormorant nests were present. An estimated 40 young were produced this year compared to 21 last year. An estimated 450 were raised in 1960. Herons were generally distributed throughout the refuge in the ditches and shallow pool areas in search of food. The last heron observed was on November 16. The great blue heron rookery is one of the attractions for tour groups that visit the refuge.

American egrets are only occasional visitors but 2 or 3 of these beautiful birds were present on Sprague Pool during July.

American bitterns, least bittern, green herons and black-crowned night herons were all observed from time to time near the pools and marsh areas. Bitterns were more often heard than seen during the spring when sounding their mating calls. The number of green herons seen this year was considerably higher than last year while least bitterns and black-crowned night herons were only occasionally observed.

Pied-billed grebes were common throughout the year with the largest number (50-100) being present during the fall period. The first bird was observed on March 17, about one month earlier than last year.

A few horned grebes were seen in late April and were not observed for the rest of the year.

Common loon arrived during the second week in May and numbered from 3 to 5 during that month. One or two remained on the refuge throughout the summer months and were frequently heard or seen on the Sprague and Rynearson 1 pools.

Sora and Virginia rails were fairly common. Both were frequently heard during the spring mating season but were seldom seen. During the month of September, 8 Virginia rails were flushed from the lily pads located in the wild rice along the Williams Dike.

Shorebirds, Gulls, and Terns

Yellowlegs, killdeer, snipe, upland plover, woodcock and three species of sandpipers were the most common shorebirds observed this year. A single observation of a black-bellied plover was recorded in late May and a Wilson's phalarope was observed in late June. During a short period around the first of May there was a general migration of greater yellowlegs and small flocks were scattered throughout the pothole and shoreline areas of the Rynearson and Sprague pools. Numerous flocks of snipe were seen in September on the Sprague Pool.

Two species of gulls and three species of terns were recorded during the year. The first ring-billed and herring gulls were observed during the middle of March. Herring gulls remained throughout the summer and one bird was known to nest on an old goose nesting platform in the Goose Pool. Both species were common during the spring and fall migrations. Common and black terns were present in their usual numbers while forster's terns were present in low numbers during the spring migration. Black terns were most abundant early in June when approximately 150-200 were present.

Doves

Mourning doves were common on the refuge but were present in reduced numbers this year. Birds were most frequently observed near the agricultural units and banding efforts there resulted in the second highest banding year, 124 compared to 234 last year. During the month of August doves were concentrated in scattered flocks along the Canfield Units and banding was highly productive. Dove numbers increased slightly during the fall migration and a few were present into December.

B. Upland Game Birds

Ruffed grouse populations were up this year after two successive years of below normal populations. Winter carry-over was good and spring drumming activity was increased over last year. Spring nesting

conditions were favorable and production was good. Brood observations and sightings of adult birds were frequent and fall hunting success was good on lands adjacent to the refuge. Providing there is a good winter carry-over the population should continue on the upward swing.

Sharp-tailed grouse experienced a slight increase over last year. Nine dancing males were counted on the Blair Unit whereas only 5 were counted a year ago. On February 2, twelve sharp-tails were seen flying into the Blair field across highway 80. Other refuge sightings and the report of observations north of Necedah substantiate the belief that the flock may be spreading. Production was assumed to be normal and a good carry-over into the winter period hopefully occurred. Controlled burning on the Blair Unit and other potential sharp-tail areas should result in future increases in the population which now numbers between 50 and 70 birds.

Wild turkeys went through the mild and relatively snow free winter with little difficulty and the spring refuge population numbered between 400 and 500 birds. Their range continues to expand as more and more sightings are reported in areas surrounding the refuge and Meadow Valley areas. Transplants of Pennsylvania stock in the 1950's have increased the present flock (both on and off the refuge) to 1500 - 2000 birds. The first turkey season was held this spring, and 20 were taken by 1,100 hunters. Five toms were shot on the 25 sections of the refuge open to the hunt. Brood observations were later this year and brood sizes were considerably smaller but production was about equal to last year. During December many of the birds were beginning to concentrate near the WCD operated feeder near the Bewick Trail. The population may experience a more difficult winter this year since more snow had fallen in December than all of last winter. The mast crop which is so important to the birds during the critical winter period is also lacking and may contribute to a decline in the population.

Woodcock may have decreased slightly during the spring migration period and fewer birds were available for the nesting season. One of the three singing ground survey routes that borders the refuge indicated a large decrease, at least for the population in that area. The other two survey routes which are located away from the refuge indicated slight increases in the breeding population. Observations of adult birds during the summer were frequent, particularly on the well travelled Speedway Road. Sightings and good hunting success on lands adjacent to the refuge indicated a normal fall migration. Only slight hunting pressure is exerted on the woodcock in this area.

Bob-white quail observations were more frequent this year but only a remnant population exists. A mild winter and good spring breeding conditions resulted in some refuge production. Near the Canfield agricultural units a couple of males were heard singing during the spring, and one observation was made on a group of 22 in September. Any build up of quail populations in this marginal range is generally lost to the harsh winters.

Ring-necked pheasants are uncommon and very few sightings were made during the year. A small population of 5 to 10 birds continues to persist south of the primary and secondary headquarters areas. Like the quail, pheasant habitat is submarginal and the only hunting that exists in the immediate area is on released, pen-reared birds.

C. Big Game Animals

White-tailed deer numbers showed little change from last year and during the period of heaviest use was estimated to be 2,800 animals. The three refuge deer seasons resulted in the harvest of 620 this fall and combined with illegal kill and general movement off the refuge the population was down to about 1,100 as of December 31. The refuge kill was down from the 675 registered last year although kill figures for the surrounding area were up. Deer production may have been down slightly based on fewer observations of twin fawns this spring. The herd appears healthy and the present harvest rate of about 700 animals each year should maintain the population and range in good condition.

Black bear is the only other big game animal to be found on the refuge. Bears that happen to use refuge lands are transients moving to and from more favorable habitat. The last time bear have been seen on the refuge was during the fall of 1963.

D. Fur Animals, Predators, Rodents and other Mammals

Mink which have been low during the past two years showed some signs of recovery this year as many more animals were sighted. Ten mink were removed during the fall trapping season and one was caught during wood duck banding operations. Only one mink was trapped last year. In June, 2 sick mink were observed by refuge personnel. One of the animals was quivering and disoriented and based on these symptoms we suspect encephalitis.

Muskrats which had reached drastically low numbers in 1965 increased significantly in 1966. A closed trapping season last year permitted the population to rebuild to near normal numbers by this fall. Rat houses showed up in fair numbers on the Sprague and Rynearson 1 pools and seepage areas where the largest segment of the population persists. Trappers removed 342 muskrat this fall.

Beaver were not trapped during the spring of 1966 to allow the population to increase. Beaver activity is more apparent this year and indicates a small increase in the population. Colonies are located on most of the major ditches flowing through the refuge. Animals that were plugging culverts on the Finley and Canfield roads had to be trapped or transplanted to new areas. As in the past beaver have flooded many acres of habitat along the drainage ditches and are an asset to our waterfowl program.

Otter are present on the refuge in limited numbers and show no change from last year. These wide travelling animals are present on most portions of the refuge at one time or another during the year. This summer observations of otter were most commonly made on the Sprague Pool, a group of three being spotted on three different occasions. Otter trapping has never been allowed on the refuge.

Raccoon numbers were significantly reduced during the winter and spring period due to an outbreak of encephalitis. At least ten sick or dead animals were seen and losses were estimated to be in the hundreds. The epidemic was preceded by a high population of raccoon in 1965. Very few adults and young were seen during the summer. Nest predation, considered one of the limiting factors in waterfowl production, was estimated to be low and resulted in a significant increase in duck production this year. A total of 24 animals were killed or trapped. For the second straight year no predation losses were sustained during the wood duck banding operation on the Sprague Pool.

Striped skunk are fairly common and are most frequently observed near the agricultural units. Only a few were seen this year but their busy activities around dove trap sites made them a nuisance. One very large skunk with an all black body and white tipped tail was observed twice in the pine plantation along the Speedway Road.

Badgers are present on the refuge in low numbers as evidenced by their diggings.

Opposum which had not been observed during the past four years made several appearances this year. Three were sighted during the summer, one of which was captured and found to be carrying young.

Weasel are common throughout the refuge but only a few observations were made of them. Refuge personnel were entertained by a long-tailed weasel on several occasions near the Ryneerson 1 blind while waiting for a cannon net shot on ducks.

Woodchuck are present in limited numbers and seven observations were made during the year.

Red fox were plentiful on the refuge with numerous sightings reported. They seemed particularly abundant in an area south of the Sprague Pool between the Bewick and Speedway Roads. Two of the three active dens reported last year were used again this year. Fox feeding patrols were common along the Sprague Dike with one of their stops at a dove trapping site. At least two animals were killed by cars on the Sprague Road. Gray fox are present in low numbers but no sightings were reported.

Coyote are frequently seen or heard near the Sprague and Ryneerson pool areas. On many occasions during the summer and fall coyotes could be heard howling on the Sprague Pool. The refuge population remains fairly constant from year to year.

Squirrels continue to be abundant throughout the timber areas of the refuge. Gray, fox and red, and flying squirrels occur with gray and red being the most common. Fox squirrels showed a significant increase over last year. Several families of flying squirrels annually make their home around the headquarters area; unfortunately one family chose to build their nest in the cushion of the refuge grader. Competition for natural nesting cavities probably occurs between wood ducks and squirrels but just how much it affects wood duck production can only be speculated.

Cottontail rabbits are present in limited numbers and are found in relatively few areas. Snowshoe hares are seldom seen but some are probably present.

E. Hawks, Eagles, Owls, Crows, Ravens and Magpies

Marsh and red-tailed hawks were the most common predatory birds found on the refuge during the spring, summer and fall. The spring hawk migration reached a peak during late March with rough-legged, red-tailed and marsh hawks the most predominant species. Considerable nesting by red-tailed hawks occurs on the refuge. Goshawks, sparrow, Cooper's and sharp-shinned hawks are present in fair numbers and observations are common. Red-tailed hawks have been suspected to nest in the area of the Carpenter Unit for the past two years. These hawks were responsible for killing a few doves along the Canfield Units during the summer banding operation. Marsh hawks also killed some doves but they frequented the trap sites along the Sprague Dike. The same three hawks that were most abundant during the spring migration were present in largest numbers during the fall. Rough-legged hawks were the most frequently observed avian predator in December but a few red-tails and marsh hawks were also present.

Bald eagles are commonly observed during the spring breakup and in the fall when the waterfowl migration is on. During these periods they searched the pools for fish and crippled waterfowl. Peak numbers reached 20 in late September with most of the activity concentrated on the Sprague and Ryneerson Pools. A few lingered on the refuge until late November when most of the pools froze over. Observations of the wintering population of eagles below the Petenwell Dam on the Wisconsin River revealed 24 bald eagles. This wintering area is only 6 miles east of the refuge and occasional flights are made by the birds to and from the refuge.

On December 21, "Red" Buchanan of Necedah found a sick adult bald eagle on his farm and brought it to refuge headquarters. The bird was cared for by a Mauston veterinary but died on the 23rd. The carcass was frozen and shipped to Patuxent Wildlife Research Center.

Golden eagles are less common and only occasional observations were made of these birds.

Osprey are occasional summer visitors that frequent the Sprague and Rynearson pool areas. Only 1 to 3 birds were thought to use the refuge during peak periods of activity. More than likely, the birds are from the Potter's Flowage west of the refuge where for years a pair has raised young.

Owls are represented by 5 species on the refuge, the most common being the great horned and barred owl. Generally, sightings of owls are uncommon during the daylight hours but numerous observations were made this year. Screech, long-eared and saw-whet owls were present in moderate numbers. Barred owls showed a significant decrease in numbers as fewer night calls were heard this year. Several doves were lost during banding operations this summer due to owl predation. At one trap site a great horned owl was often seen perched in a tree waiting for doves to enter the traps. One snowy owl was seen November 10 near the Laske field.

Crows are common throughout the year with the largest concentrations occurring during the fall period. During the spring breakup large numbers of birds flocked to the Sprague Pool to feed on dead fish.

F. Other Birds

Bluejays, downy and hairy woodpeckers, black-capped chickadees, white-breasted nuthatches and tree sparrows were again the most common winter birds to be observed near winter feeders. Less common winter birds sighted included red-bellied woodpeckers, horned larks, cedar waxwings and slate-colored juncos. Two pileated woodpeckers were observed north of the headquarters area on March 15. Winter residents were joined by early migrants this year as the first red-winged blackbird showed up on the Sprague Pool in mid-March. By late March belted kingfishers, yellow-shafted flickers and eastern meadowlarks had joined the list of early arrivers.

White-winged crossbills which had not been reported on the refuge until November of last year made their second refuge appearance in March.

Late spring migrations occurred in mid-May for Myrtle warblers, bank swallows and Baltimore orioles.

Nesting of "other bird" species appeared to be normal. Large numbers of tree swallows that nested on the refuge began staging and migrating south during the first week in August, followed by martins during the second week. On August 23 there was a sudden appearance of fair numbers of cedar waxwings and nighthawks near the Sprague Pool. For the next ten days there was a spectacular migration of nighthawks through the refuge and surrounding area as literally thousands of birds filled the air. A continuous migration of yellow-shafted flickers passed through the refuge during the first two weeks of September. All other song birds appeared to migrate through the fall period in normal concentrations.

G. Fish

Fish populations on the refuge vary from year to year depending on fluctuations in pool levels. Northern pike, perch, sunfish, bullhead, carp and sucker were present in most refuge pools and ditches in limited numbers. During the preceding two winters the Sprague and Ryneerson 1 pools have been drawn down for rough fish control and all fish populations have been reduced. Most of the larger fish which include pike and carp are present on these two pools. Northern pike provide most of the catch for fishermen on the Sprague Pool, however, some bullheads and a few small perch are also caught.

Following the winter drawdown of the Sprague Pool last year, WCD personnel netted and transplanted over 300 pike from below Ryneerson 2 structure to the Sprague Pool. Some of the pike were as big as 5 and 6 pounds. An additional 300 were transplanted from the WCD Wild Rose holding pond. After a drawdown generally two or three years are required to produce fish of catchable size. Low water levels on the Sprague Pool again this winter will probably delay the buildup in the fish population for at least another year.

H. Reptiles

Because of their nature, reptiles as a general rule are not prone to ready observation, however the following species were observed during routine refuge activities during the course of the year:

Alligator snapping turtle	Northern leopard frog
Common snapping turtle	American toad
Blanding's turtle	Fox snake
Western painted turtle	Eastern garter snake
Wood turtle	Eastern hognose snake
Five-lined skink	Northern red-bellied snake

Blanding's, snapping, and painted turtles were egg laying most of June and probably provide some buffer against raccoon predation on waterfowl nests. Turtle trappers removed a small number of snappers from Pool 1 in late June. Hognose snakes, garter snakes, and leopard frogs were common throughout the summer.

I. Disease

During the spring and early summer numerous sightings were made of sick and dead raccoons and mink. One of the raccoons was sent to Dr. Daniel Trainer of the University of Wisconsin and an autopsy revealed that the animal had encephalitis. About ten affected animals were sighted and losses were estimated to be in the hundreds. The die-off was preceded by a high local population of raccoons.

In August a local Canada goose was found dead on one of the refuge agricultural units. The carcass was sent to Dr. Trainer and the autopsy showed that a 2 pound tumor of the pancreas had pinched off

Some of the vital blood vessels and caused death. The young bird was raised on the refuge and banded during the June drive trapping operations on Rynearson Pool 1.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

1. Water Management

Rocked wing walls on Pools 13 and 27 to prevent erosion.
Widened and built up Pool 18 dike west of structure.
Replaced channel iron holding stoplogs in structure Pool 9.
Rocked emergency spillway Pool 9, approximately 16 yards.

2. Road and Trail Maintenance

Built up and graded low spots on Pool 19 road.
Constructed three miles of permanent fire breaks north of Sprague Pool.
Constructed $3\frac{1}{2}$ miles of permanent fire breaks scientific area.
Graveled $1\frac{1}{2}$ miles of trail along Canfield agricultural unit, approximately 980 yards.
Graveled soft spots Sprague-Mather dike, approximately 100 yards.
Graveled $1\frac{1}{4}$ miles of Sprague-Mather dike, approximately 500 yards.
Graveled Laske access road $1\frac{1}{4}$ miles, 500 yards.
Graveled soft spots on Williams and Canfield Roads, approximately 100 yards.

3. Fencing and Posting

Posted open and closed areas for spring turkey season, early and late deer archery seasons, and the deer gun season.

Erected two fishermen information signs.

4. Buildings

Quarters 1: Remodeled kitchen, new cabinets and new windows.
Painted several interior rooms. Painted exterior.

Shop: Painted interior

Office: Panelled old portion of office, constructed clothes closet, storage closet and cabinet for radio and office supplies.

5. Equipment

Periodic property screening at nearby Camp McCoy for refuge materials and equipment.

Repaired tracks, rollers, sprockets, and rails on TD-9.

Many maintenance jobs too numerous to mention occurred on automotive, farm, and construction equipment.

6. Agriculture Units

Leveled 50 acres of crop land in the Canfield Unit.

Removed tree roots on 60 acres of crop land in Canfield Unit.

7. Miscellaneous Items

Constructed banding site on Ryneerson Pool 2.

Bone yard cleanup.

B. Plantings

1. Aquatic and Marsh Plants

Under the Youth Opportunity Campaign nine boys dug up some 300 clumps of softstem bulrush (Scirpus validus) in Ryneerson Pool 1 for transplanting in the Sprague Pool. The clumps of 3 to 5 stems were planted on 60 acre area northeast of the north end of the Rattail Lateral. The area appears to meet all requirements for waterfowl production habitat except brood cover. The clumps were planted in 1-2 feet of water and were distributed randomly throughout the area. To determine if future transplants are feasible this project should be evaluated. Previous transplants along dikes for dike stabilization have been successful.

In an attempt to expand the production of wild rice (Zizania aquatica) 60 pounds of seed were harvested from the rice bed east of the Williams Dike for sowing on other parts of the refuge. Seed was planted on 15 acres of Pool 19 and Ryneerson Pool 1. Only open water areas in the east portion of 19 were seeded. Suitable waters on the main pool area in the north half of Ryneerson 1 and pothole areas east of the Ryneerson 1 east dike were seeded. If the seeding is successful the rice will provide large quantities of food for ducks, particularly wood ducks.

2. Trees and Shrubs

200 spruce, 100 white cedar, 50 ash, and 50 maple seedlings were planted around refuge headquarters and the picnic sites on the Sprague Pool.

3. Upland Herbaceous Plants - None

4. Cultivated Crops

Farming operations on 302 acres was carried out by refuge personnel. In addition to the acreage farmed, 205 acres were fallow or in native grasses. These units will be maintained in grass until such time that

waterfowl food demands require that the areas be intensively farmed. In keeping with Necedah's trend toward centralizing the farming effort and retiring small fringe units, only 20 acres of grain crops were planted outside the Canfield Units. Farming activities were largely concentrated on the Canfield Units this spring. Grain crops planted in 100 foot strips were separated by 100 foot strips of grass and legume seedings. Total refuge crop acreage includes 80 acres of grain, 40 acres of corn, and 192 acres of grass and legume browse crops.

A major difference in the establishment of browse crops this year was the elimination of rye crops. Last year approximately 95 acres of rye was available. Of the 182 acres present this year, about 100 acres were new plantings. Grass mixtures used in the seedings included various combinations of bluegrass, timothy, red top, birdsfoot trefoil, vernal alfalfa and alsike and ladino clover. Even though hot, dry weather limited the catch on these seedings, enough survived to provide some fall browse.

Grasses and legumes planted in 1965 experienced varying success. An excellent catch was obtained on 52 acres of alfalfa seeding on the Carpenter and Laske Units, but dry weather in June this year set them back considerably. Potash and boron deficiencies necessitated fertilizing the two units in August. Waterfowl use of the areas was low because of the toughness of the browse. The mixed grass seeding of the Hanson Unit resulted in a good catch and provided some browse and nesting cover. Alsike clover along the Parham ditch provided good browse.

Light frost in August did no damage and before the first killing frost on September 15 most of the crops were matured. Four of the 40 acres of corn was sweet corn and did not fully mature because of a late planting.

Buckwheat production was excellent this year with many of the seedings resulting from disced under waste seed left from last year. On these units the resulting stand was too dense to allow good utilization by waterfowl and had to be harvested. Good stand density seemed to be obtained by seeding about 3 pecks to the acre. Approximately 30 acres of buckwheat were harvested, resulting in a yield of 230 bushels of seed. Much seed was left on the ground as a result of the poor harvest operation. The estimated yield for the 80 acres was 25 bushel per acre.

Yield for the 36 acres of field corn was estimated at 35 bushel per acre. Sweet corn produced about 25 bushel to the acre. The plantings were fertilized, side-dressed and cultivated, and sprayed with atrazine herbicide. Almost complete utilization was obtained by geese and sandhill cranes.

Japanese and wild millet was sown on 40 acres of the refuge pools while they were drained. A total of 400 pounds of Japanese millet was planted on 15 acres of the Goose Pool in June. The resulting catch combined with good germination of wild millet and smartweed seed,

produced large volumes of waterfowl food. In september 500 pounds of wild millet seed was scattered on 25 acres of Ryneerson 2, Parham and Goose Pools and Pool 13 for germination next spring. Waterfowl use on portions of the Goose Pool that could be flooded was excellent.

A breakdown of cropland acreage by unit is shown below:

<u>Unit</u>	<u>Buckwheat</u>	<u>Corn</u>	<u>Alfalfa</u>	<u>Clover-grass mixtures</u>	
Upper Canfield	20e	20e		45g	
Middle Canfield	25g	20e		42f	
Lower Canfield	15g			10e	
Yates				8g	
Hanson				16p	
Williams	15g				
Parham-Becker	5g			9g	
Laske			32p		
Carpenter			20p		
	80	40	52	9	182

Letters following acreages indicate degree of use by waterfowl:

e-excellent g-good f-fair p-poor

C. Collection and Receipts - None this period

D. Control of Vegetation

Controlled burning will never control willow on the wetter sites. Spraying in the past with a Hanson brodjet sprayer using 2,4,5-T to control willow had proved ineffective. This year 115 acres of willow in Ryneerson Pool 1 and 130 acres of willow in the Roach fields were sprayed with 2,4,5-T using a back pack mist blower. The islands and peninsulas of Ryneerson Pool 1 have a high potential for waterfowl use, but the undesirable growth of sweet fern and willow has made much of this habitat unattractive. The Roach fields were farmed many years ago and as the farming was abandoned and the site became wetter willow took over completely. The spraying this year killed 80% of the willow. If this high degree of kill continues then the mist blower will have solved one of our big management problems.

Atrazine was again used on the refuge corn fields to control quackgrass and smartweed. This was applied with a Hanson boom sprayer and gave us complete control of all weeds in the treated fields.

Refer to NR-12 for complete details of spraying and results.

E. Planned Burning

The objectives of the 1966 burning program were to improve waterfowl habitat, enhance upland game habitat, and improve the forest resource.

This refuge has been slowly losing much of its best marsh and upland habitat to the encroachment of undesirable species and only a well organized burning plan can bring it back to its most productive state. The intensive management of 10,000 acres surrounding impoundments and adjoining upland areas should greatly increase the wildlife use on the refuge. Of the 3,000 acres approved for burning only 1,500 acres were burned.

All pool margins and upland areas near pools must be burned every two or three years to retard the invasion of undesirable woody and marsh vegetation. Burning of these areas helps re-establish native grasses and make the areas more attractive to nesting waterfowl. Approximately 1,800 acres of pool margin habitat were approved under the 1966 controlled burning plan and 900 acres were burned.

Approximately 600 acres of upland burning were approved under the 1966 controlled burning plan and all 600 acres were burned. This upland burning is needed to keep our forest openings free from encroachment by jack pine and aspen. Approximately 240 acres of upland were burned in the new scientific area which is scheduled to be burned every 2 or 3 years. A memorandum of understanding between the State Board for the Preservation of Scientific Areas and the Bureau has been approved for the management of this area. The topography is flat to slightly rolling with a cover of jack pine and northern pin oak with many openings. It is hoped this can be reverted to an oak-savanna type as it was before the coming of the white man. All treatments will be well documented and the information should be beneficial to all land managers.

Approximately 680 acres were approved to be burned for forest management practices. None of this was burned due to the difficulty of constructing fire breaks. The fire breaks have now been constructed and the area will be burned in 1967.

The 1966 acreage burned doubled the acreage from the previous year, but is still not enough if the upland areas and pool margins are to be kept free of undesirable vegetation. The limiting factor in our burning program is the limited number of good burning days we have each spring. Each year more permanent fire breaks are being established and this will allow us to burn at other times of the year. This is the only feasible way 4,000 to 5,000 acres can safely be burned each year.

Refer to the next page for fire weather and costs for controlled burns.

1966 Fire Weather and Costs for Controlled Burns

Date	Area Burned	Acreage Burned	Temperature	Spread Index	Buildup Index	Relative Humidity	Wind	Labor Costs	Equipment Costs	Total Costs	Cost/Acre
3-1-66	5	100	44	18	2	36	NW-12	\$ 33.00	\$ 1.50	\$ 34.50	\$ 0.345
3-2-66	5	50	41	17	4	47	SE-13	19.00	3.00	22.00	.440
3-14-66	5	80	55	12	11	39	SW-4	27.00	2.00	29.00	.362
3-15-66	5	200	41	12	12	60	SE-9	34.00	2.00	36.00	.180
3-17-66	5	40	72	43	13	39	S-22	30.00	2.00	32.00	.800
3-29-66	2	130	51	16	5	46	NW-10	43.00	2.00	45.00	.346
4-4-66	5	100	43	20	12	42	NW-10	21.50	2.00	23.50	.235
4-11-66	6	220	49	26	21	32	E-12	93.50	9.00	102.50	.466
4-12-66	9	20	48	30	23	31	NE-14	19.00	0.50	19.50	.975
4-12-66	2	150	48	30	23	31	NE-14	31.00	2.00	33.00	.220
4-13-66	2	50	52	23	25	31	NE-7	75.00	2.00	77.00	1.540
4-14-66	9	25	59	19	28	25	W-5	44.00	2.00	46.00	2.300
4-22-66	10	120	62	25	32	37	SE-7	67.00	14.00	81.00	.675
4-25-66	Scientific	80	65	19	39	33	SW-4	37.00	3.00	40.00	.500
4-29-66	"	160	60	29	41	31	S-8	74.00	5.00	79.00	.444
		<u>1,525</u>						<u>\$648.00</u>	<u>\$52.00</u>	<u>\$700.00</u>	

Average cost/acre burned = \$0.459

Average cost, burns over 50 acres \$0.376/acre

Average cost, burns under 50 acres \$1.062/acre

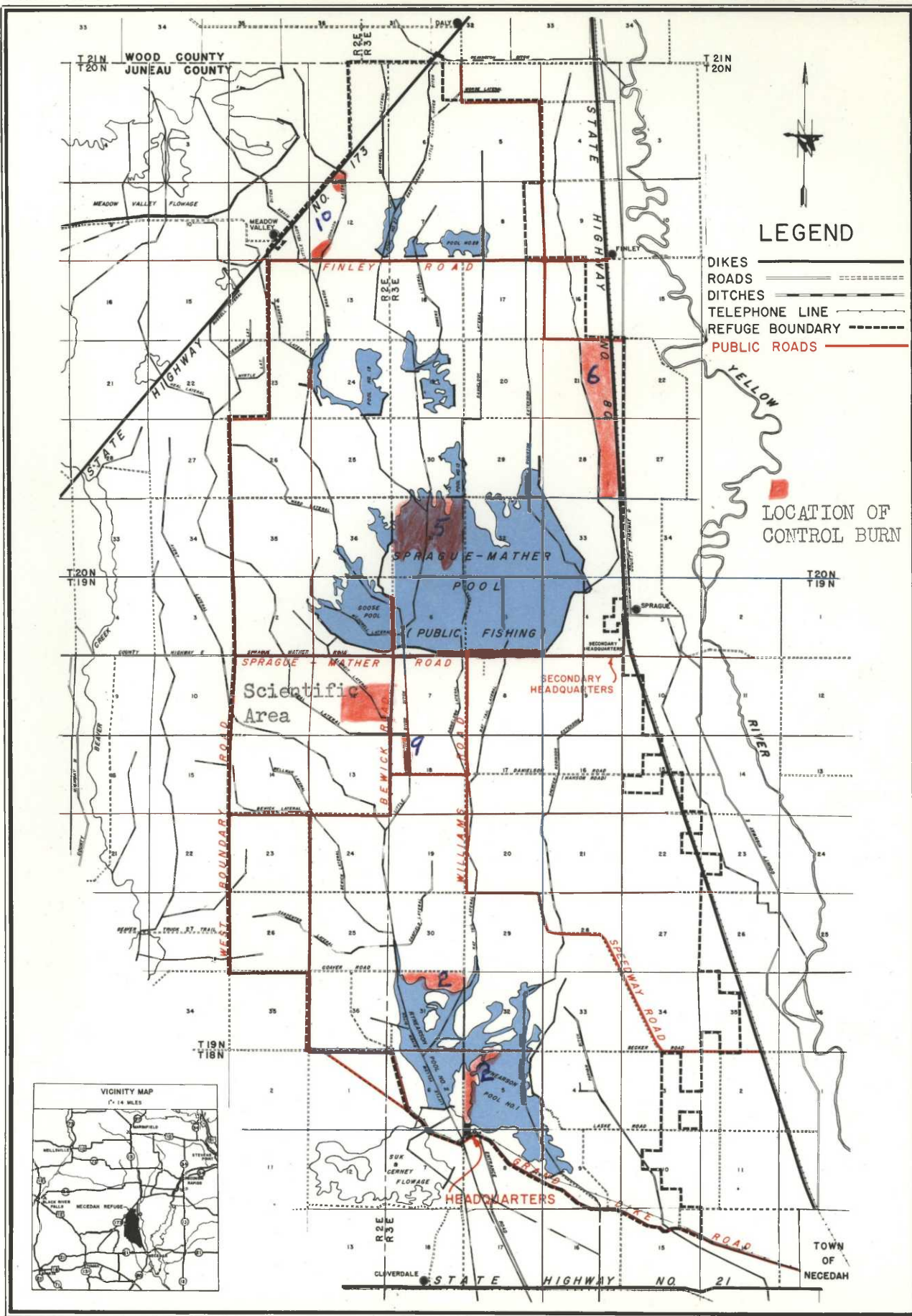
Equipment cost is operating expense and does not include depreciation.

NECEDAH NATIONAL WILDLIFE REFUGE

JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED IN THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

JANUARY, 1960

FOURTH PRINCIPAL MERIDIAN

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DIAGRAM

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1960

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F. Fires

No fires occurred on the refuge this year. The fire danger was extreme during some periods of the spring, summer and early fall. The refuge assisted the State on May 6 and October 4 in extinguishing fires near Cutler which were started by trains. This quick assistance aided in keeping these fires small.

On October 4th the State requested refuge assistance in fighting a 20 acre peat fire near Camp Douglas. Harold Carter and the refuge D-7 dozer were immediately sent and helped the State for two days before the fire was considered safe. Carter contacted poison ivy carried by the smoke which resulted in a lost time accident of four days.

IV. RESOURCE MANAGEMENT

A. Grazing

One permit, 66-8 was issued to Arthur Siegler for grazing cattle on the 100 acre Unit 6. The \$5.00 deposit was forfeited as no cattle were grazed on the area. The forage on this unit is of poor quality and dry weather this summer made the vegetation unpalatable. Past grazing on the area has been instrumental in discouraging the encroachment of brush and maintaining the area in grass.

B. Haying

None

C. Fur Harvest

No beaver trapping permit was issued this year because of the low beaver population. Several nuisance animals were removed from areas where dams or plugged culverts were threatening to flood roads. The WCD trapped out a colony on the Finley Road and refuge personnel trapped and transplanted two beaver from the Bewick Lateral on the Canfield Road to Rynearson Pool 1.

One trapping permit, T-9959 was issued to John Bagnowski to trap mink, muskrat and raccoon on all portions of the refuge. Bagnowski was assisted by Don Pech and together they removed 10 mink, 342 muskrat and 13 raccoon. The mink season ran from Nov. 5 - Dec. 19, the muskrat season from Nov. 5 - Dec. 31. Mink and muskrat were divided on a 50/50 share except that the trapper kept all rough furs. Refuge furs have not been sold as of the end of the year.

Other animals removed by refuge personnel during the year include 11 raccoon and one mink.

D. Timber Removals

Eleven pulpwood permits were in force during 1966 and 3,462.87 cords were harvested. Total revenue amounted to \$18,367.18. The table below gives the cordage removed by species and the average price received:

<u>Species</u>	<u>Cords</u>	<u>Average Price/Cord</u>
Jack pine	2,538.69	\$ 6.66
Oak	125.00	0.50
Aspen	493.18	1.95
Birch	306.00	2.00

As of December 31, 1966, 4 permits were still in effect. A complete summary of all wood harvested is included on the NR-11 form.

This year marked the first time any wood has been sold on a lump sum sale to permittees. The volume sold on these sales is based on an estimate. Lump sum sales save much time as no scaling is required and fewer billings are issued. The permittees realizing they have paid for all the wood on a given area do a much better job of utilization. Before permittees paid for just the wood cut and removed from the refuge and some of the smaller trees, dead trees, and trees with defects were not harvested. The lump sum sale gives the refuge much better control over the timber harvest.

The field work involved in the forest inventory has now been completed. The data are being summarized and soon the Forest Management Plan will be written. This is the first intensive inventory conducted on the refuge and the end result will be better land management for timber and wildlife.

E. Commercial Fishing

None

F. Other Uses

One permit was issued to Joe Haske to maintain an apiary on the refuge for the period July 14 through September 30, 1966. Thirty hives at a charge of 10¢ per hive were located along the Canfield farm units to improve buckwheat pollination.

V. FIELD INVESTIGATIONS OR APPLIED RESEARCH

A. Banding - General

A total of 1,490 birds were banded during the year. Below is the breakdown by species:

Mallard	651
Canada geese	343
Wood duck	278
Black duck	20
Blue-winged teal	8
Pintail	6
Widgeon	2
Green-winged teal	<u>1</u>

Sub-total: 1,309

Mourning Dove	124	
Red-winged blackbird	<u>44</u>	(nestlings)
Great blue heron	7	(nestlings)
Bluejay	3	(nestlings)
Upland plover	2	
White-breasted nuthatch	<u>1</u>	

Sub-total: 181

Grand Total: 1,490

B. Wood Duck Banding

This year was the second straight year of poor wood duck trapping conditions and banding operations resulted in only 278 caught and banded. The first attempt was made to trap wood ducks with a cannon-net and results were encouraging with 185 banded, as many as 55 in one shot. Continual lowering water levels on the Sprague Pool hampered trapping efforts with 1x2" weld-wire walk-in traps. Areas on the Rattail Lateral which have consistently produced excellent results were dry this year. Attempts to move traps ahead of receding water levels prevented any large numbers of birds from establishing feeding patterns at the trap sites. Birds trapped in walk-in traps included 83 wood ducks, 70 mallards, 6 black ducks, 1 blue-winged teal, and 1 pintail. Total wood ducks banded at Necedah to date is 3,182.

In future years cannon netting holds much promise for banding wood ducks at Necedah. Less time and effort is required and banding quotas can be filled with fewer trips to the banding site. Wood ducks trapped this year with the cannon-net cost less than half of what birds were banded for walk-in traps.

For the second straight year there were no losses due to raccoon or mink predation. Steel traps set at either side of chicken wire stretched across peninsulas leading to the trap sites provided ample protection. Six raccoon and one mink were removed during the banding operations.

In addition to the 278 wood ducks banded, 40 returns and recoveries were obtained.

The following table shows the wood duck banding accomplishments for the past 5 years:

	<u>Adult</u>		<u>Immature</u>		<u>Local</u>		<u>Totals</u>
	M	F	M	F	M	F	
1962	279	114	67	38	4	12	514
1963	635	185	34	30	3	2	889
1964	236	49	35	22	1	3	346
1965	78	27	10	15	3	2	135
1966	179	33	42	19	3	2	278

The recovery rate for wood ducks through 1965 was 9.22% (242 recoveries for 2,624 wood ducks banded). The two main harvest areas for birds moving through the Necedah area are Wisconsin and Louisiana with 34.7% and 21.5% respectively, of the recoveries. Forty-four percent of 125 direct recoveries are from Wisconsin.

C. Canada Goose Banding

A total of 343 Canada geese were banded during 1966, 334 of them during the fall migration period. In July attempts were made to drive trap and band local birds on Ryneerson 1 and Pool 19 with limited success. Three successful drives resulted in the capture of 9 geese, 6 of them locally raised birds. Considering the small population of geese present on the pools at the time of the drives the project was rewarding. Hopefully through continued summer banding efforts more will be learned about what happens to Necedah's local Canada goose flock. In addition to the birds banded, 41 recoveries and returns were obtained. The cumulative total of Canada geese banded at Necedah is 3,458.

Of the 1,000 bird preseason quota only 16 were banded prior to the waterfowl opening. The Ryneerson 1 east dike site which consistently produced large catches last year failed to attract geese this fall. The lower Ryneerson 2 site was re-activated late in the banding season and proved to be the most productive site. Since a large portion of the goose population on the lower pools is concentrated on Pool 2, the site was leveled and permanent posts were set for use next year. Throughout the banding season the banding sites were competing with the attraction of excellent refuge crops on the Canfield Units.

A total of 17 experimental birds were trapped and turned over to the Wisconsin Conservation Department for a chemical stress study being conducted at Stevens Point College.

The following table gives the age and sex data for Canada geese banded during the past 5 years:

	AM	AF	IM	IF	Unknown	Total	Ratio Adult to Immature
1962	57	48	80	62	0	247	1/1.35
1963	172	145	137	123	0	577	1/ .82
1964	169	155	192	193	1	710	1/1.19
1965	184	138	133	167	1	623	1/ .93
1966*	104	94	71	65	0	334	1/ .69

*Figures exclude birds banded in summer drive trapping operations.

As of August 1, 1965, 373 recoveries (14.9%) were received from a total of 2,492 geese banded at Necedah. Illinois accounted for 44.5% of the recoveries, Wisconsin 32.2%. Approximately 75% of the Illinois recoveries were direct. A significant number of Necedah's returns are from the Horicon NWR area, 42 of the 120 Wisconsin recoveries (35%).

D. Mallard Banding

A total of 651 mallards were banded this year. This was the first year that a preseason quota of 500 was given to Necedah. Mallards accepted the banding sites early and very little difficulty was experienced in trapping 622 birds preseason. In addition 7 recoveries and returns were obtained. The cumulative total of mallards banded at Necedah is 2,103.

The following table gives the sex and age data for mallards banded during 1966:

	AM	AF	IM	IF	LM	LF	Unknown	Total
1966	86	114	213	217	11	8	2	651

Of 1,452 mallard bandings from 1957 through 1965, 14.9% or 216 recoveries have been received. Wisconsin is all by itself as the main recovery area as 45.8% of the recoveries are from that state. Illinois, Arkansas, Minnesota, Mississippi and Kentucky, in that order of importance, have recovery rates ranging from 4 to 8%. Seventy-seven percent of Wisconsin's recoveries are direct.

E. Mourning Dove Banding

This years dove banding effort resulted in the second highest number of birds banded. Only 124 were banded this year compared to 234 last year although the cost per dove banded was .80¢ less. Proso millet again was the best bait and the best trapping period occurred before or after a rain. The highest return for banding effort was obtained during late August when the doves began concentrating along the Canfield agricultural units. A concentrated effort at this time appears to be the most favorable time to undertake this project.

Predation though decreased from last year was still a problem as many birds were lost to fox, raccoon, skunk and avian predators. The avian predators were by far the most destructive. Great-horned and barred owls and marsh and red-tailed hawks all killed doves in traps. On one Sprague Pool site a red fox was scared from the traps on several occasions.

The table below shows the age and sex data for the past two years of banding:

	AM	AF	IM	IF	Unknown	Total
1965	145	50	3	0	36	234
1966	71	22	3	3	25	124

Since the dove banding program at Necedah is relatively new and few recoveries have been received, no conclusions can be made concerning the population. However, of the 10 recoveries as of the first of the year, 3 are from Louisiana, 2 from Mississippi, and 1 each from Texas, North Carolina, Mexico, Georgia and Alabama.

F. Nest Structure Projects

Nest Boxes

Twenty-four metal cone wood duck boxes were put up prior to the nesting season this spring. Along with eleven old boxes which were revamped and relocated, the total number of boxes is now 35. Two of these were used by wood ducks this year. Other boxes were used by gray squirrels, flickers and tree swallows; boxes that were placed over water were particularly susceptible to swallows. To determine the extent of homing behavior of some of the locally produced birds, fish fingerling tags were placed on 12 young wood ducks from one nest.

An additional 100 wooden boxes constructed this summer by Explorer Scouts and YOC boys will be put up this winter. Most of the boxes will be located on the Sprague Pool with several being clustered around boxes that were used last year.

Fiberglas Goose Platforms

Three variations of fiberglass goose nesting structures were placed on the Sprague and Ryneerson 1 Pools and Pools 18 and 19 this spring. The variations included: 25 plain structures, 25 with wood duck boxes with 10 inch extensions, and 25 with wood duck boxes without extensions. Half of each type with a wood duck box had the boxes painted black. None of the platforms were used by ducks or geese, however the wood duck boxes were readily accepted by tree swallows. One of them contained a purple martin nest.

In an attempt to imprint young geese to the artificial nesting structures, three goose nests were raised onto structures which were placed on the ground. Two of the three hatched successfully, one contained 8 eggs, the other 7 eggs. Next year an attempt will be made to elevate the structures on short legs after lifting the nests onto them.

Biological Technician, Bill Renaker has undertaken a 3 year research project to evaluate the fiberglass artificial nesting structures. A progress report will be prepared at the end of each summer.

VI. PUBLIC RELATIONS

A. Recreational Uses

A wide range of activities attracts visitors to the refuge. Hunting continues to rank first in public use followed by sight-seeing, fishing, berry picking and bird-watching. Although the refuge is open to some form of recreation year around, most of our public use comes in the spring and fall.

Blueberry picking was another "bust" as nearly all the berries were hit by frost. A few patches that escaped the frost were rapidly picked over. We haven't had a good berry year since 1962.

Fishing is permitted on the Sprague Pool during summer and winter. Summer fishing was poor (as expected) since this was the first year following draw down. Winter fishermen reported varying success although some northerns were caught in the 6 pound class. As a general rule fishing was nothing to brag about although we should experience better fishing the 2nd and 3rd year after draw down.

Sight-seers continue to take advantage of the many miles of public roads that pass through the refuge to view deer, turkey, waterfowl, and other forms of wildlife. Weekend travel is particularly heavy during the summer and fall. Many persons from the surrounding locale come to view ducks and geese during the fall migration.

During the fall many people come to refuge headquarters to view waterfowl on the two Ryneerson Pools although many are finding that the Bewick Trail north of the Sprague-Mather Pool also offers a good vantage point for watching birds.

The refuge continues to be a preferred hunting area for the Wisconsin archer. Thousands are attracted to the area during the early and late bow and arrow season. Obviously, some hunters are under the illusion that this is an easy place to shoot a deer since the refuge is consistently reported as the highest archery kill area in the State. The novice soon learns that there is no magic formula for killing deer. The deer gun season attracts a high number of hunters but the hunting pressure is probably not much higher than it is on lands adjacent to the refuge. Wisconsin's first turkey season, a spring gobbler hunt, took place this year with approximately 40% of the refuge open to public hunting. The hunt presented no particular refuge problems and will probably be permitted again next year.

The Necedah Bow Shoot conducted by the Wisconsin Bowhunters Association attracted approximately 2,000 persons to their annual shoot. This archery affair is held on Bureau owned-State management lands south of the refuge headquarters and appears to be growing in size each year. A few families took advantage of the refuge tours that were offered on Saturday and Sunday.

B. Refuge Visitors

<u>Date</u>	<u>Name and Organization</u>	<u>Purpose</u>
1/11	Ben Hubbard, WCD, Babcock, Wis.	Goose kill data
2/2	Gene Mosely, Wis. Water Reg. Board	Water mgmt
2/8	Norman Johnson, BSWF, Mpls. Minn.	Predator control
2/17	Dr. Wm. E. Green, BSWF, Winona, Minn	" "
3/15	Bob Personius, Mgr. Horicon Refuge	Truck transfer
"	Wendell Crews, Ass't. Mgr. "	" "
3/16	Leo M. Brieske, GSA, Chicago, Ill.	Equipment maint.
3/22	Edgar Klein, WCD, Wis. Dells	Fish mgmt
3/23	Pat Kline, WCD, B. R. Falls, Wis	" "
3/28	Gene Mosely, Wis. Water Reg. Board	Water mgmt.
3/29	Sid Hovde, WCD, Dist. Forester-Mauston	Timber mgmt
3/31	Nora Magalee, Correspondent-Sparta	Public relations
4/5	Orie Louchs, U. of Wis Scientific Div	Scientific area
"	Richard Forman, " "	"
4/8	Dr. & Mrs. S.C. Reed, U. of Minn.	View waterfowl
4/13	Richard Hunt, WCD, Horicon	Waterfowl mgmt
"	Harold Hanson, Urbana, Illinois	"
4/20	James H. Bartee, Holla Bend NWR, Ark.	Tour refuge
4/20	Milt Reeves, BSWF, M&E. Mpls.	Goose mgmt.
5/17	Art Hughlett, BSWF, Washington	Inspection
"	Mr. Mitchell, " "	"
5/18	Carl Pospichal, Mgr. Rice Lake Refuge	Property transfer
6/9	Dr. Wm. E. Green, BSWF, Winona, Minn.	Nesting studies

<u>Date</u>	<u>Name and Organization</u>	<u>Purpose</u>
6/9-10	Frank R. Martin, BSW Ass't Ref Supv.	Inspection
6/15	Dr. Wm. E. Green, BSW, Winona	Nesting studies
6/15	Robert Mitchell, Juneau Co. Agent	Soils inspection
6/26	Dr. Robert Andile, Ass't Dir. Buffalo Museum of Science	Tour
"	Dr. Harold Axtell, Curator of Biology	" "
"	James Dorr, Chief Preparator	" "
7/24	Frank McGilvrey, BSW, Patuxent	Wood duck studies
"	Dr. Wm. E. Green, BSW, Winona	"
8/3	Clifford Germain, Wis. Scientific Board	Scientific Area
"	Mr. Tans, " "	" "
8/13	Robert Dries, WCD Area Supv. B.R. Falls	Courtesy call
8/16	Donald Zlesak, WCD Fisheries " "	Fish for research
9/13	Messrs. Gray, Foster, Krumm, Charmley, Wright, Patten and Lawson, Upper Miss. Refuge	Law enforcement meeting
"	Messrs. Stinnett, Lindvall, Reynoldson	USGMA's " "
"	Bob Personius, Mgr. Horicon Refuge	" "
"	James E. Walsh, BSW, Lake Mills Hatchery	" "
9/24	Dr. Wm. E. Green, BSW, Winona	Wildlife Inventory Plans
10/17	Herb Dill, BSW Staff Spec. Mpls	Nesting Studies
"	Forrest Lee, BSW, NPWS, Jamestown ND	" "
10/20	Robert Personius, Mgr. Horicon Refuge	Tour refuge
10/26	Jack Frost, Coloma, Wis.	Mallard release project
11/4	Frank R. Martin, BSW, Mpls	Inspection
"	John Jones, BSW, Washington Safety Off.	"
"	Walter Ettleman, BSW, JC Washington	"
11/7-8	Clair Rollings, BSW, Staff Spec. Mpls	Soil & Moisture
11/19-20	Lyman Reynoldson, USGMA, Eau Claire, Wis	Enforcement patrol
Frequent Visits	Marshall L. Stinnett, USGMA, Madison	Enforcement
	Clarence Smith, WCD Meadow Valley Mgr.	Mutual problems
	Ron Kubisiak, WCD Warden, Necedah	Enforcement

C. Refuge Participation

1/3 Collins met with town board re: repair of refuge roads.

1/14 Collins talk to 180 Tomah 7th and 8th grade students.

1/11 Collins and Lipke to Poynette Game Farm for wing-bee.

1/24-28 Collins, Lipke and Gritman attended Regional Conference at Minneapolis.

3/1-4 Gritman type-mapped Pools 8 & 9, Upper Mississippi Refuge

3/1 Collins contacted town chairman re: maintenance of refuge roads.

3/24 Gritman talk and slides to Rockview School, 5th & 6th grades.

3/24 Gritman talk and slides to 17 Hustler School, grades 5, 6, & 7.

- 4/5 Lipke talk and slides to 36 Tomah Rotarians.
- 4/12 Collins and Gritman talk to 25 students at Tomah High School, career days.
- 4/13 Lipke tour for 20 Rockview School 7th grade students
- 4/14 Collins talk and slides to Necedah American Legion County meeting.
- 4/20 Collins attended Conservation Congress meeting at Madison, Wis.
- 4/24- Collins attended joint meeting with BSWF and U.S. Forest
25 Service on recreation fees at Hayward, Wisconsin
- 4/26 Gritman talk and slides to 53 Tomah Cub Scouts.
- 4/30 Lipke tour and slides for 10 Boy Scouts from Bangor, Wis.
- 5/4 Collins talk and slides to 20 members from New Lisbon American Legion.
- 5/7 Lipke conducted tour for 5 from Platteville State College.
- 5/10 Lipke tour and slide talk for Stoughton School students.
- 5/13 Collins and Lipke accompanied Harold Hanson and Richard Hunt, WCD on field trip to check sub-species of refuge nesting geese.
- 5/20 Collins, Gritman, Carter and other Bureau personnel attended WCD sponsored goose management meeting at Tomah, Wis.
- 5/25 Lipke short tour and talk for 20 Lawrence College Students, Appleton, Wis..
- 6/7 Collins went on tour of Air National Guard-Volk Field facilities with base commander.
- 6/26 Collins arranged refuge facilities for annual director's meeting of Wisconsin Bowhunters Association.
- 6/27 Lipke and Renaker conducted tour for 40 Wisconsin 4-H Award Winners.
- 7/17 Wood duck meeting at refuge headquarters with Messrs. Green, Collins, Lipke and McGilvrey.
- 8/24- Gritman attended Society of American Foresters meeting at
27 Hayward, Wisconsin
- 8/25 Collins, Lipke and Gritman presented 9 summer YOC students with "Order of the Buffalo".

- 9/8 Collins to see Dr. Daniel Trainer, U. of Wis., Madison regarding autopsy of local Canada goose and raccoon die-off.
- 9/10 Annual Director's meeting of Wisconsin Field Archers held at refuge headquarters.
- 9/10 Lipke tour and wildlife observation for 15 from Necedah Bow Shoot.
- 9/13 Enforcement meeting at refuge headquarters for Wisconsin Bureau personnel.
- 9/17 Collins tour and talk for 35 from Methodist Church group, Tomah, Wisconsin
- 9/22 Gritman presented check from refuge receipts to Juneau County, Mauston, Wisconsin.
- 9/23 Collins presented check from refuge receipts to Wood County, Wisconsin Rapids, Wisconsin.
- 9/27- Collins to Horicon Refuge to assist in goose hazing project.
28
- 9/28- Lipke, Gritman and Rudolph to Horicon Refuge to assist in
10/7 goose hazing project.
- 10/1 Collins and Rudolph talk and tour for 12 Tomah Girl Scouts.
- 10/8 Collins, Gritman and Lipke tour and talk for 29 from Michigan Technological University, Houghton, Michigan.
- 10/11 Collins to V.A. Hospital, Tomah for wage rate survey.
- 10/14 Collins to Badger Ordnance Depot for wage rate survey.
- 10/17 Refuge meeting with Messrs. Dill and Lee on artificial duck nesting structure study.
- 10/17 Collins, Lipke and Gritman to Jack Frost Mallard Farm to tour facilities and discuss mallard release project.
- 10/19 Lipke tour and talk for 16 Sparta Garden Club members.
- 10/22 Lipke tour and talk for 11 from Minnesota Ornithological Union.
- 10/27- Collins, Lipke and Gritman to Crex Meadows Wildlife Area to
28 tour area and discuss control burning program with WCD personnel.
- 11/8 Collins talk for 30 Elroy Rotarians.
- 11/16 Collins talk and tour to 35 Necedah High School students.

- 12/7-8 Collins to regional office to discuss artificial nesting platform study.
- 12/11- Collins to Midwest Wildlife Conference, Chicago, Illinois.
14
- 12/15- Collins to regional office for Bureau goose meeting.
16

In addition to the above activities several members of the refuge staff are active in community affairs. Harold Carter has been active in the Necedah Volunteer Fire Department for the past 11 years. Ed Collins is the Commander of the Necedah American Legion Post.

D. Hunting

The 1966 goose season for Wisconsin opened at noon on October 8 and was limited to Saturday, Sunday and Monday in the counties of Columbia, Dodge, Fond du Lac, Green Lake, Jefferson, Juneau and Winnebago. When it was determined that the quota of 14,000 had been reached, the season was to be closed in these 7 counties and continued for a period of 20 days for the remainder of the State. The season in the 7 counties lasted $2\frac{1}{2}$ days with most of the geese being killed in the Horicon area. The kill around the Necedah Refuge, including Meadow Valley, was estimated at 230 birds most of which were killed on the firing line. Hunters were unhappy with the short goose season and most of them blamed the Bureau and the Bureau's hazing project carried on at Horicon for the shortest goose season on record. After the season closed in Juneau county a few geese were reported killed at the Sandhill Game Farm in Wood county and along the Wisconsin River in Adams county.

Waterfowl hunting is not permitted on the refuge since ample hunting opportunity exists on thousands of acres of land surrounding the refuge. Duck hunting at times was very good, particularly on the Meadow Valley flowages where hunters were pass shooting mallards. Wood duck and mallard shooting was fair on the Yellow River bottoms but poor on the Lemonweir River. Duck hunting was excellent on Lake Tomah and the Mississippi River.

Deer hunting has been permitted on the refuge since 1945 when archery hunting was first permitted. The following year the refuge was opened to gun hunting and has been open to the taking of deer each year since. In recent years between 600-700 deer are removed each year during the hunting season.

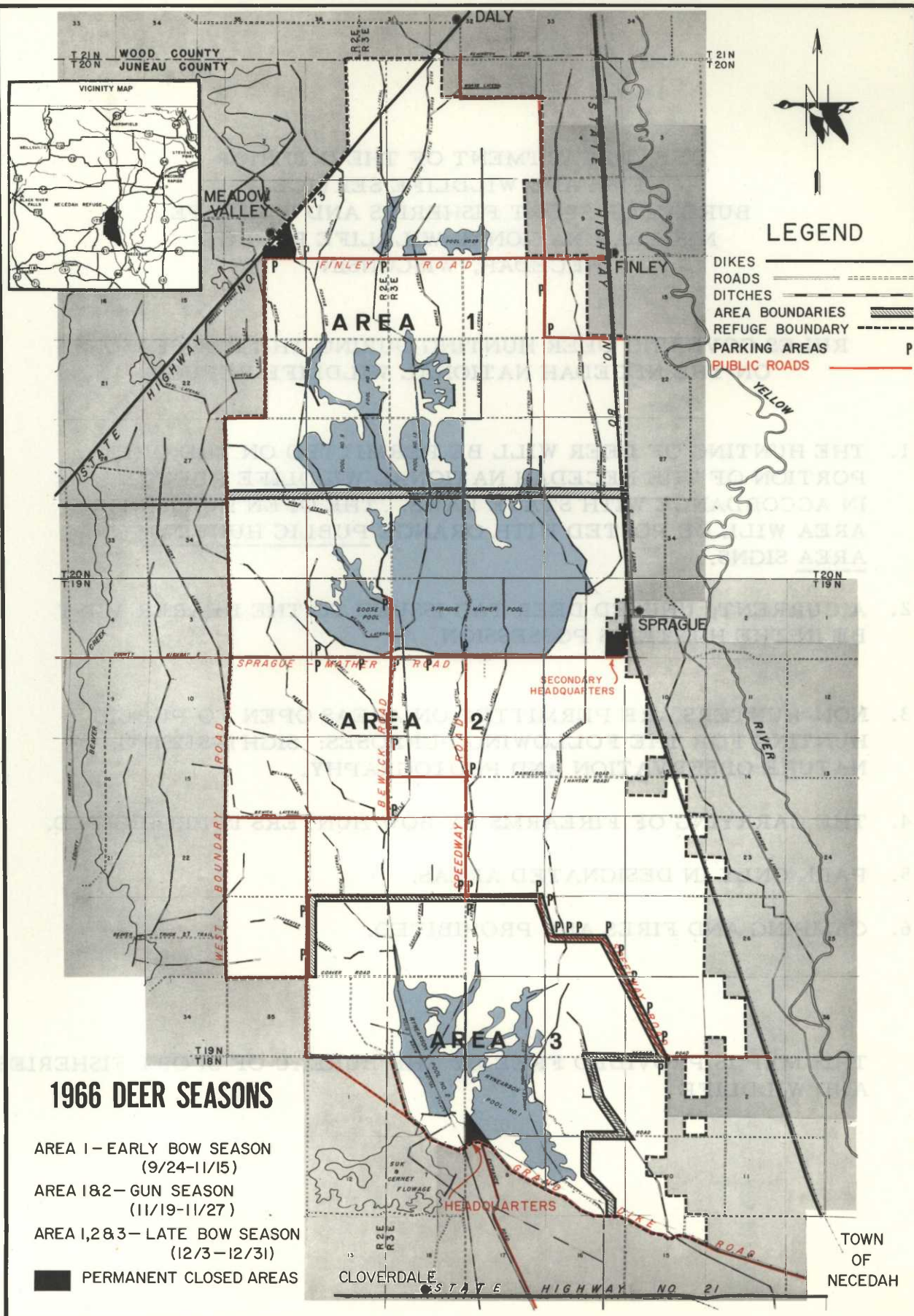
The early bow and arrow season extended from September 24 to November 15 and resulted in the harvest of approximately 40 deer. Many of the deer were taken on the opening weekend when 1,600 hunters concentrated into the north one-third of the refuge. Hunter pressure after the

NECEDAH NATIONAL WILDLIFE REFUGE

UNITED STATES
DEPARTMENT OF THE INTERIOR

JUNEAU COUNTY, WISCONSIN

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED IN THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

JANUARY, 1960

FOURTH PRINCIPAL MERIDIAN

Scale 0 10 20 30 40 50 60 70 80 90 100 MILES

TOWNSHIP
DIAGRAM

MEAN
DECLINATION
1960

3R WIS. 274 409

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
NECEDAH NATIONAL WILDLIFE REFUGE
NECEDAH, WISCONSIN

RULES COVERING DEER HUNTING DURING THE 1966 SEASONS
ON THE NECEDAH NATIONAL WILDLIFE REFUGE

1. THE HUNTING OF DEER WILL BE PERMITTED ON THE OPEN PORTION OF THE NECEDAH NATIONAL WILDLIFE REFUGE IN ACCORDANCE WITH STATE LAWS. THE OPEN HUNTING AREA WILL BE POSTED WITH ORANGE PUBLIC HUNTING AREA SIGNS.
2. A CURRENT, UNUSED DEER TAG ISSUED TO THE BEARER MUST BE IN THE HUNTER'S POSSESSION.
3. NON-HUNTERS ARE PERMITTED ON AREAS OPEN TO PUBLIC HUNTING FOR THE FOLLOWING PURPOSES: SIGHT-SEEING, NATURE OBSERVATION AND PHOTOGRAPHY.
4. THE CARRYING OF FIREARMS BY BOW HUNTERS IS PROHIBITED.
5. PARK ONLY IN DESIGNATED AREAS.
6. CAMPING AND FIRES ARE PROHIBITED.

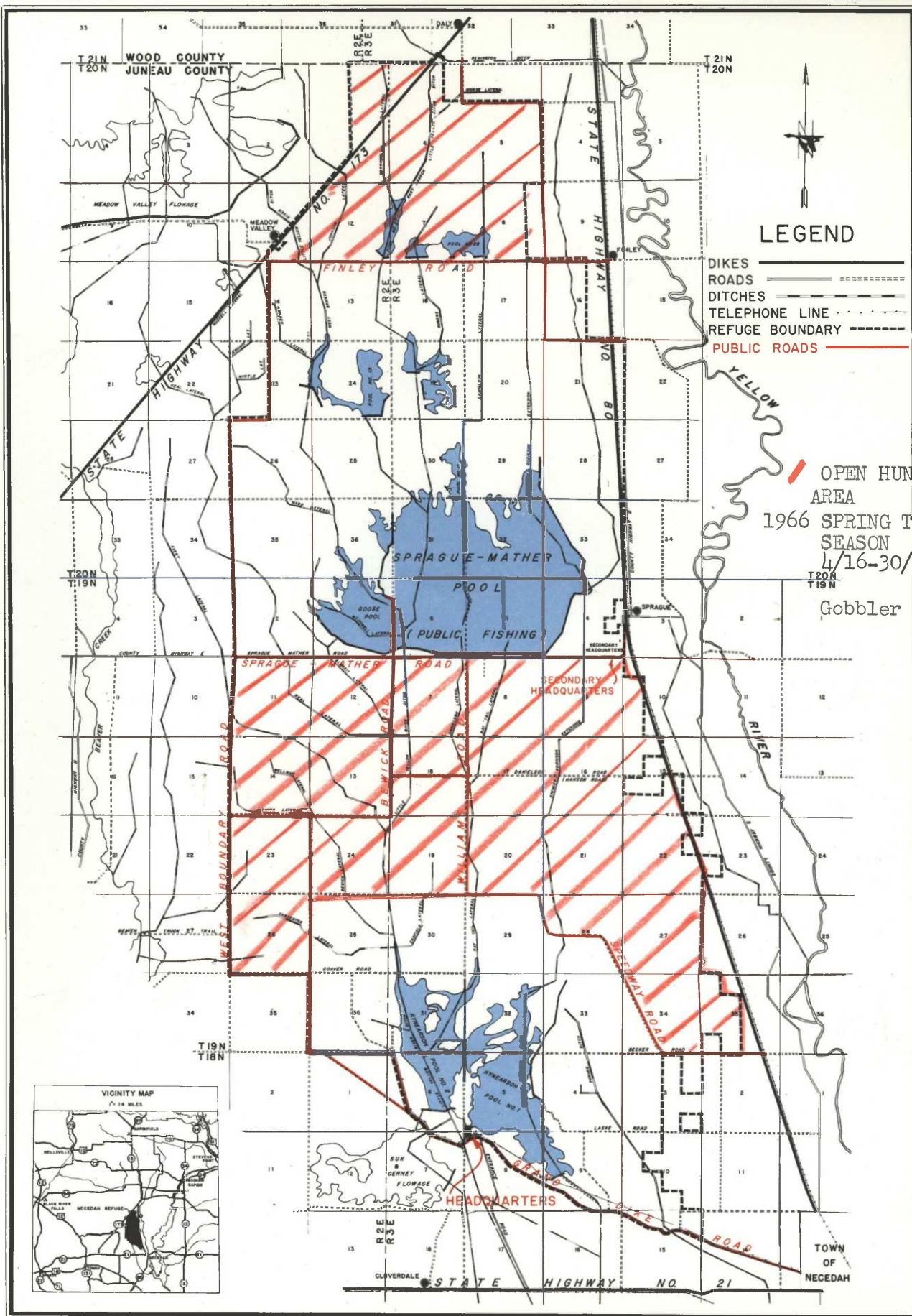
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NECEDAH NATIONAL WILDLIFE REFUGE

JUNEAU COUNTY, WISCONSIN

UNITED STATES
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MINNEAPOLIS, MINNESOTA

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FOURTH PRINCIPAL MERIDIAN

Scale 0 10 20 30 40 50 60 70 80 90 100 MILES



TOWNSHIP
DIAGRAM



MEAN
DECLINATION
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first two weekends was negligible. Approximately 4,400 gun hunters used the refuge during the 9 day season that lasted from November 19 through the 27th. An estimated 350 deer were removed during the gun season, many of them "quota" deer. Hunting pressure was slightly higher than last year but was reported to be down slightly on lands surrounding the refuge. The illegal kill appeared to be less than last year but even that is too much. Particularly noticeable this year was the increased number of nice bucks taken off the refuge and the surrounding areas. The late archery season attracted approximately 6,100 hunters which from a safety view point is several thousand too many. Hunters removed 230 deer during the late season most of them during the first day. Total refuge deer kill for the 3 deer seasons was 620 animals.

Wisconsin's first turkey hunt was a spring gobbler season extending from April 16 through the 30th. Approximately 1,100 hunters were issued licenses which resulted in the harvest of only 20 turkeys, 5 of them from the refuge. Approximately 40% of the refuge was open to hunting but excluded all lands surrounding our major impoundments. Hunter density was 2-3 hunters per square mile which we felt had no adverse affect on our waterfowl management program. The State hopes to get approval for both a spring and fall hunting season in 1967.

E. Violations

The following violation cases made by Bureau personnel were turned over to the local Conservation Warden for prosecution in County court at Mauston, Wisconsin:

<u>Name</u>	<u>Violation</u>	<u>Fine & Costs</u>
Robert E. Dray, Beloit, Wis.	Hunt deer in closed area	\$ 28.00
Robert Dray, Sr., Gillingham	"	"
Louis G. Neuworth, Milwaukee	"	"
Paul S. Beck, Oshkosh	"	"
Kisell S. Johannessen, Chicago	"	"
James Stadler, Oshkosh	"	"
Phil Weisheiph, Oshkosh	"	"
Mike Mateyka, Oshkosh	"	Juvenile
Keith H. Prickette, Fond du Lac	"	28.00
Edward Prickette, "	"	"
Thomas W. Kepler, Madison	"	"
Donald Nicholls, Madison	"	"
Eric R. Koch, Richland Center	"	"
Ronald Waldsmith, Mt. Horeb	"	"
Vernon Nevel, Lone Rock	"	"
Reginald McCauley, Richland Center	"	"
Howard G. Farrell, Ottawa, Ill.	"	"
William B. Angel, Ottawa, Ill.	"	"
Arthur E. Farrell, Ottawa, Ill.	"	"
Bruce Brassington, Madison, Wis.	"	Juvenile
Richard Brassington, Middleton, Wis.	"	"

<u>Name</u>	<u>Violation</u>	<u>Fine & Costs</u>
Daniel Blasius, Muskego, Wis.	Possession uncased gun	18.00
Lyle J. Swanthout, Wauwatosa,	"	18.00
Douglas, Jackson, Elroy, Wis	Shoot doe during closed	53.00
Robert M. Traxler, Whitewater,	" season	103.00
David Nelson, Wis. Rapids, Wis	Shoot buck w/horns less	53.00
	than 3" long	
Vilas Seather, Poynette, Wis.	Hunt within 200' of	28.00
	State Highway 80	

The following cases were handled by U.S. Commissioner James Bannen, LaCrosse, Wisconsin: (Cases carried over from calendar year 1965)

<u>Name</u>	<u>Violation</u>	<u>Fine</u>
Rocco Coconate, Milwaukee, Wis.	Park vehicle in	\$ 35.00
LaVern Fischer, Ft. Atkinson	unauthorized area	30.00
George Fischer, Janesville, Wis.	"	"
Lawrence Luedtke, Janesville, Wis	"	35.00
Eugene Luedtke, Reedsburg, Wis.	"	30.00
Gerald Misna, LaValle, Wis.	"	35.00
Richard Norin, Stoughton, Wis.	"	30.00
Erwin Evenson, Janesville, Wis.	"	35.00
Thomas Beaddie, LaCrosse, Wis.	"	10.00
Derryl Bell, Wonewoc, Wis.	"	35.00
Glenn Miller, Fond du Lac, Wis.	Hunt w/o deer tag	25.00

State Conservation Wardens handled 27 additional cases in Juneau County court for violations that occurred on the refuge in 1966.

F. Safety

Listed below are subjects covered during refuge safety meetings:

- 1/20 Carter discussed artificial resucitation.
- 4/18 Gritman reviewed safety procedures involved when fighting wild fires.
- 6/16 Gritman, Lipke, and Lennartson demonstrated the proper use of axes, chain saws, and Swedish brush axes to all YOC students and pointed out the safety hazards involved in using these tools.
- 7/29 Lipke conducted meeting on storm hazards.
- 8/15 Lennartson discussed safety in the woods. Renaker reviewed first aid procedures.
- 9/20 Carter gave talk on fire fighting procedures.
- 10/31 Collins discussed hunting safety.

- 11/30 Arrowsmith reviewed the hazards of winter driving.
- 12/16 Gritman conducted meeting on cold weather dangers. Rudolph suggested each staff member discuss a safety hazard he has corrected or needs correcting. This will be done at all future meetings.

Our safety committee of Gritman, Arrowsmith, and Carter assisted and advised the manager on safety problems. No lost time accidents occurred involving YOC students. These students spent much of their time on brush removal using axes, chain saws, and Swedish brush axes.

The following safety hazards were corrected this year:

Periodic fire extinguisher checks and constant general cleanup.

Basement steps painted with a non-skid paint.

Non-skid tape put on truck running boards.

Chain saw chaps were purchased as protective clothing to prevent accidental cutting of legs.

The only lost time accident at this station was an unusual one. On October 4, Harold Carter was using a dozer in the suppression of a peat fire. He contacted poison ivy on his hands, neck, forehead, cheeks, inside of mouth, and eyes. This severe case of poison ivy required medical attention. Proper clothing was worn and to our knowledge Harold did not come in direct contact with any poison ivy plants. It is believed smoke was the carrier of the poison ivy. Lost time, 6 days.

Our station safety record as of December 31, 1966 was 88 days since a lost time accident.

VII. OTHER ITEMS

A. Items of Interest

Rudolph, Lipke, and Gritman were among the many Bureau personnel engaged in the hazing program carried out at the Horicon Refuge. They reported many long, cold, wet nights were spent in the marsh. All say they would volunteer to go again if needed.

A cooperative agreement between the Bureau and The State Board for the Preservation of Scientific Areas was completed setting aside 240 acres of refuge land as a scientific area. This upland area of jack pine and oak with many small grass openings will be burned every 2 or 3 years in an attempt to return and maintain an oak-savana type as it was in presettlement days. The fires, changes in

vegetation, and wildlife use will be well documented and the findings will be of great use to all wild land managers.

Nine local boys worked during the summer period under the YOC program. These boys cleared brush on islands in the Sprague Pool, sprayed undesirable vegetation with a mist blower, transplanted bulrush in Rynearson Pool 1, cleaned up the boneyard, painted the interior of the shop, and completed many minor maintenance jobs. The YOC program has enabled us to complete many jobs that had been put off for many years due to lack of man power.

Two college summer students were again employed this year. Bill Renaker from Western Illinois University was our wildlife student for the second straight year. Bill is now a graduate student and is writing his thesis on the nesting platforms used at this station. Bill will be back in March 1967 to gather more data on these nesting structures. Jim Lennartson from the University of Minnesota was employed as a forestry aid and spent the summer on timber sales, photo interpretation, and cover type mapping under the direction of our refuge forester. Jim did excellent work and returned to school in September to complete his senior year.

We are sorry to report that Harold Hanson, who retired as maintenanceman in December 1965 after 17 years at this station, is seriously ill in the Mauston hospital. Harold suffered a heart attach in December 1966 and has been hospitalized since that time.

Manager Ed Collins was injured in an automobile accident near Pittsville, Wisconsin on March 14. Ed had a near head on collision, was thrown from his car and received multiple injuries. His passenger, Father Chilicki from Necedah was more seriously injured and spent 6 months in the hospital. Ed missed 3 weeks of work and while he was home recuperating his wife Ruth gave birth to their third daughter, Janet Adrienne.

Vern Rudolph, refuge clerk at Necedah for 17 years, was presented his 20 year pin on June 20. Besides his clerical duties Vern assists in banding, control burning, farming, public relations, and enforcement work. He had lived on the refuge the entire time until this summer when he moved into his newly built home one mile west of Necedah on Highway 21.

Bob Arrowsmith, refuge mechanic, was presented a Superior Performance Award of \$150 on June 30. Bob has been a Bureau employee for 27 years and this is his second such award in the past four years. The award was based on his enthusiasm for accepting new jobs and his ability to accomplish his work in a highly skilled manner, usually resulting in a savings to the government.

B. Photographs

Photographs by Collins, Lipke and Gritman

Credits: Collins, VI-A-D

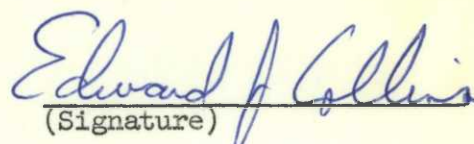
Lipke, I, II, III-B, IV-A-C, V, VI-C, VII, captioned photos

Gritman, III-A-D-E-F, IV-D, VI-F, VII-A

Rudolph, VI-B-E, typing and assembly

SIGNATURE PAGE

Submitted by:


(Signature)

Edward J. Collins

Refuge Manager

Title

Date: February 8, 1967

Approved, Regional Office:

Date:

Feb. 14, 1967

(Signature)

Regional Refuge Supervisor



Manager Ed Collins

R-20, E-18

Lipke



Forester Jim Gritman-left, Assistant Manager Howard Lipke-right.
R-20, E-7 Collins



Clerk Vern Rudolph

R-20, E-8

Lipke



Mechanic Bob Arrowsmith R-20, E-10 Lipke



Operator General Harold Carter R-20, E-13 Lipke



Feb. - "Assembly line" Refuge staff completing assembly of fiberglass goose nesting platforms. R-1, E-12 Collins



Feb. - Carter and Rudolph attaching wood duck box to goose nesting platform. Fifty of the 75 structures have boxes. R-1, E-14 Collins



Feb. 26 - Boy Scout Troop of Necedah helped place nesting structures on ice as one of their winter projects.
R-1, E-6 Collins



March - Carter attaching braces to legs of nesting structure. Majority of the platforms were placed on isolated portions of the Sprague-Mather Pool. R-3, E-9 Lipke



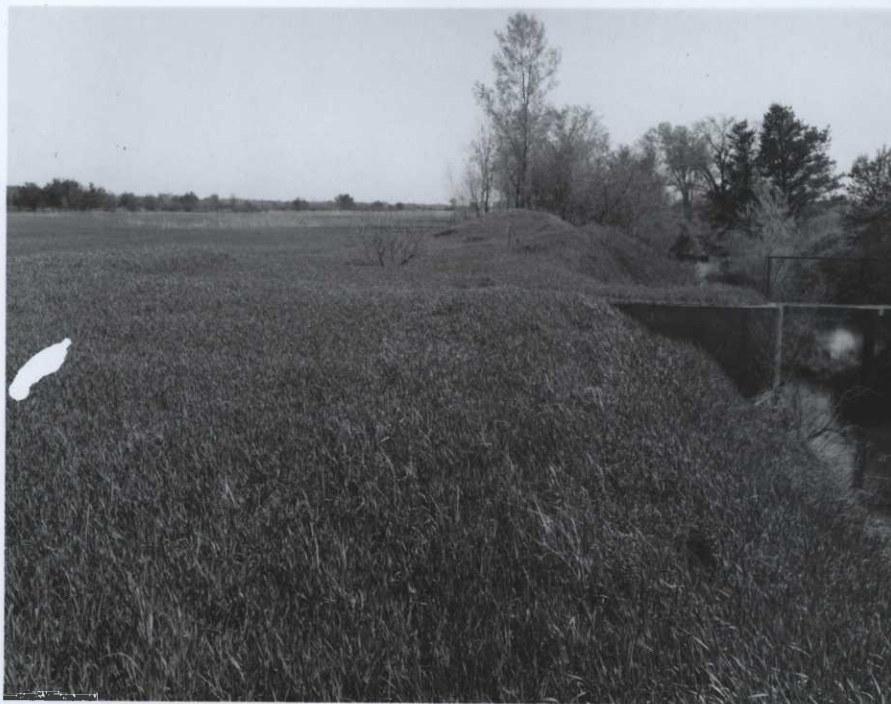
March 1 - Control burn on Sprague Pool islands to eliminate dead timber and encourage grass growth for waterfowl nesting cover.
R-2, E-17 Lipke



March 17 - Control burn in seepage area below Sprague Pool to control brush and remove dense vegetation. R-6, E-9 Lipke



April 29 - Carter patrolling fire break in Army M-37 with pump unit. Control burning on the 240 acre scientific area will revert and maintain the oak-savanna type of pre-settlement days. R-4, E-7 Lipke



May 25 - Grass cover on Blair Unit following a spring control burn. The area provides habitat for a large segment of the remnant sharp-tailed grouse population. R-7, E-15 Lipke



Barbed wire fence was too big a barrier for this white-tailed deer. R-3, E-9 Collins



April 16 - One of 20 happy hunters to bag a gobbler during the first Wisconsin turkey season. Five were taken from the 16,000 acres of the refuge open for the spring hunt. R-3, E-2 Collins



May - Nesting island in lower end of Rynearson l on which Canada geese have nested for 13 consecutive years. R-5, E-6 Lipke



May 4 - Lipke placing goose nest on fiberglass structure in attempt to imprint young. Two of 3 nests lifted were successfully hatched. R-5, E-10 Collins



May 3 - First gosling hatched was about 2 weeks early. Three of the 4 eggs did not develop due to freezing. Estimated production to flight stage is 40. R-4, E-19 Lipke



March 23 - Wisconsin Conservation Department personnel netting northern pike below Rynearson 2 structure for transplants to Sprague Pool and State spawning waters. R-3, E-1 Gritman



Dredging operation during the early 1900's. A steam powered dredge dug the ditches that drained much of the land in and around the refuge. Operators floated their living quarters and supplies behind them.



Plenty of runoff and then some. Small refuge control structures were not designed to handle excessive runoff and are being modified.
1965 R-8, E-20 Lipke



Rynearson Pool 1 and control structure. Islands on this lower segment are attractive to nesting geese. Upper portion of the pool contains typical marsh habitat. R-5, E-16 Lipke



May 25 - Dike cover adjacent to Sprague Pool seepage area. Habitat is in much need of improvement and control burning has given desired results. R-6, E-7 Lipke



April - Pool habitat typical of the northern portion of Sprague Pool. This pool provides sites for majority of wood duck boxes.
R-4, E-2 Lipke



Mechanic Robert W. Arrowsmith receiving \$150.00 superior performance award from Manager Collins. R-15, E-9 Gritman



June - Summer Aids, ~~Left~~ Bill Renaker (Biological Technician)
right-Jim Lennartson (Forestry Aid). R-8, E-16 Lipke



June - Bill Renaker checking for usage of goose platform and
attached wood duck box. Bill has undertaken a research project
to evaluate five variations of the structures. R-5, E-13 Lipke



Gritman and Lipke with nine Youth Opportunity Campaign boys employed for the summer; left to right, Lipke, Larry Murphy, Reynold Bourgard, George Nowicki, Ron Steen, Jack Jasinski, Joe Coady, Dave Coady, Emil Baumgart, Gritman and Ray Strack.
R-13, E-14 Collins



June - Gritman and Lennartson conducting demonstration on safe use of cutting tools for YOC crew. R-8, E-9 Lipke



June - YOC crew stacking brush on Sprague Pool island thinning project. Habitat improvement will provide better wood duck nest sites and encourage grass understory. R-13, E-7 Lipke



June - Lipke demonstrating to YOC student method of transplanting bulrush clumps on Sprague Pool. About 60 acres were planted to establish brood cover. R-8, E-12 Renaker



June - Stump and snag removal by YOC boys on Canfield Unit prior to grass and legume seeding. R-8, E-1 Lipke



July - Mixed grass and legume seeding on the Hanson Unit. The area is one of several units seeded to allow concentration of farming effort on centralized Canfield Units. R-12, E-15 Lipke



Busy beaver dammed ditches and plugged culverts throughout the summer. Several problem animals were trapped and transplanted.
R-14, E-3 Collins



October - Mallard and goose use of moist soil plants was good on portions of Goose Pool that could be flooded. R-16, E-2 Lipke



October 8 - Gritman discusses timber management practices with group from Michigan Technological University. R-18, E-7 Collins



August - Carter dozing in dense woolgrass depression above Rynearson Pool 2. Fifteen 40' x 80' potholes should make this area extremely attractive to breeding ducks. R-13, E-11 Lipke



August - Completed pothole above Rynearson Pool 2. Remainder of non-merchantable timber will be felled and the area control burned to encourage grass growth. R-13, E-3 Lipke



September - WAE Woggon seeding spoil banks of dozed potholes with grass mixture. R-14, E-11 Collins



June 30 - Lipke and Lennartson banding two local Canada geese. Nine birds were banded in drive trapping operations on Rynearson I. R-11, E-14 Renaker



October 8 - Michigan Technological University students participate in mallard banding on Rynearson I east dike site. R-14, E-14 Lipke



August - Contracted top dressing of Carpenter Unit alfalfa
with potash and boron. R-14, E-1 Collins



July - Strip cropping on Middle Canfield Unit. Poor soils
limit refuge crops to buckwheat, green browse and corn.
R-12, E-9 Lipke



September - Raking first cutting of grass strip in Upper Canfield. R-14, E-2 Collins



October - Goose use on Canfield Units was excellent and little grain was left. Fall peak of Canadas was 10,700. R-16, E-7 Lipke



September 10 - A few of the 2,000 participants of the Necedah Bowshoot sharpen their eye before the early deer season.
R-14, E-7 Collins



September - Though camping is not permitted on the refuge ample opportunity exists on adjacent lands. Three refuge deer seasons attracts thousands of hunters to the area.
R-14, E-12 Collins



December 4 - Parking lot north of Williams gate. For the second straight year more than 6,000 bow hunters participated in the opening of late deer season. Most have left the refuge by 11 AM.
R-19, E-11 Collins



December 4 - Now there's a party of successful bow hunters!
620 deer were taken during 3 refuge seasons. R-19, E-6 Collins



December 4 - One of the bigger racks taken during the late
bow season. R-19, E-8 Collins



Clerk Vern Rudolph receives his 20 year service pin from
Manager Collins. R-12, E-16 Lipke



September - Dozing pothole north of headquarters for demonstration area. R-15, E-1 Collins



One of 45 potholes dug with dozer around Ryneerson Pools 1 and 2. Evaluation will determine if more will be dug. R-12, E-7 Lipke



November 3 - Lipke and Gritman ready to dig charge holes for pothole blasting with ammonium nitrate. R-17, E-12 Collins



November 3 - Experimental potholes were blasted using various sized charges. Sites were generally monotypes too wet for a dozer to work in. R-17, E-11 Lipke



November 3 - One of 10 potholes blasted on west side of
Rynearson I. Waterfowl use of the potholes will be studied
to determine whether more blasting will be done.
R-19, E-7 Lipke



November - Pool 18 dike was raised and widened in July to give
year around access. R-18, E-20 Lipke



March - Harold Hanson, retired WAE Maintenceman
receiving Commendable Service Award from Manager
Collins. R-1, E-15 Lipke



Waterfowl, upland and big game hunting on lands surrounding
the refuge provide estimated 37,500 man-days use.
R-19, E-15 Collins



October - Waterfowl hunting adjacent to refuge provides one recreational use of the resource. Many come to refuge just to observe waterfowl. R-14, E-16 Collins



December - Two trapping permittees removed 10 mink, 342 muskrat and 13 raccoon during the 1966 season. R-19, E-11 Collins



September 13 - Law enforcement workshop held at refuge headquarters prior to opening of waterfowl season. Left to right, Jim Gritman, Tom Charmley, Marshall Stinnett, Ken Krumm, Bob Personius, Eric Lawson (receiving 30 year pin) Bob Wright, Bart Foster, Don Gray, Bob Arrowsmith, Vern Rudolph, Eugene Patten, Harold Carter and Jim Walsh.
R-13 Collins